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The Evolution of the PADIS Programme
(1979 - 1984)

THE EVOLUTION OF THE PADIS PROGRAMME (1979 - 1984)

This paper attempts to summarize the contents of the main design documents prepared on the implementation of the present Pan African Documentation and Information System (PADIS). The purpose is to bring to the fore the highlights of each study or a number of studies prepared around the same time, so as to enable an understanding of the conceptual developments that have taken place since the idea for an African information system was put to paper in 1977.

Section A briefly cites the earliest proposals for an African information system.

Section B presents in a fairly detailed manner the fundamental concepts put forward by the Interagency Mission that prepared the prefeasibility study for DEVSIS-AFRICA.

Section C provides a very brief account of the implementation of the DEVSIS-AFRICA project or more properly, the first phase of the present PADIS project.

Section D recapitulates the main design features of the PADIS system as described in the design document prepared by ECA/PADIS in November 1980 (Document number E/CN.14/789 and E/CN.14/TPCW. II/6).

Section E presents the major ideas contained in the UNDP Inter-Country Project Document for the 'Creation, Strengthening and Consolidation of PADIS'.

Section F is a summary of the activities carried out during the period 1982-1984.

Section G provides a summary of the major critical opinions expressed by different specialists on the various aspects of the Project.

Section H contains concluding remarks.

A. Early proposals for an African information system

1. One of the earliest proposals for an African information system was the the African Development Information Network (AFDIN) promoted by the ECA c. 1977/78. At about the same time, there were proposals for an African Statistical Data Bank, again, to be promoted by the ECA.

2. At its Fifth Meeting, held in Rabat, Morocco in March 1979, the ECA Conference of Ministers endorsed Resolution 359 (XIV) DATA BANK* 1 which, inter alia, invited the Executive Secretary to provide resources to assist Member States to create national numerical and non-numerical information systems and services; to assist Member States to establish national data banks; and, to facilitate access of African countries to data banks of industrialized countries.

B. The DEVSIS-AFRICA Prefeasibility Study * 2

3. The prefeasibility study for DEVSIS-AFRICA is, by far, the most comprehensive study conducted in connection with the present PADIS Programme. It seems the preparation of the Resolution mentioned in the last paragraph had also benefited from the prefeasibility study, by which time the preliminary findings of the latter have been known.

4. The problem to which the study addressed itself to is presented in the report as follows: "... it has been recognized for some time that the situation with respect to information about socioeconomic development is far from satisfactory" and continues to elaborate the benefits to be derived from the exchange of development experience among countries. In conclusion it states "it was with these considerations in mind that the Mission studied the feasibility of setting up a Pan African information system addressed to the mission of development." Therefore, "the structure of the system proposed in this report to be called DEVSIS-AFRICA - will follow, in most respects, the design proposed for DEVSIS ..."* 3

5. However, " ... DEVSIS AFRICA will address itself, to a greater extent than was proposed in the DEVSIS (global) report to the needs of science and technology policy makers. This slight modification of the DEVSIS scope is justified by the importance of science and technology policy to development and by the dearth

* 1 United Nations; Economic Commission for Africa: Annual Report, April 1978 to April 1979, United Nations, New York, 1979; p.70

* 2 ECA-OAU-IDRC Mission; DEVSIS-AFRICA: Prefeasibility Study for a Pan African Documentation and Information System for Social and Economic Development; United Nations; June 1979, 253 p.

* 3 Ibid., p. 7-8

of information services in this field in Africa"* 4

6. Having admitted the need for expanding the scope of the system proposed by the DEVSIS global study when applying it to the African situation, the study continues to state, "one can envisage for the future, a Pan African network of regional and subregional information systems, established, like DEVSIS-AFRICA in accordance with international guidelines.* 5

7. More importantly one reads the following: "The Team has proposed that DEVSIS-AFRICA be a mission oriented information system within the broader framework of Pan African information system and network. In order to support the development of DEVSIS-AFRICA, the team has recommended assistance to African Member States to build national information infrastructures and information handling capabilities. Member States would thus not only be able to participate in ... DEVSIS-AFRICA but also in other Pan African information systems".* 6

8. With reference to system development and the activities of DEVSIS-AFRICA the Team provided recommendations on a wide spectrum of topics including: flexibility in system design; development of common norms and guidelines; provision of advisory services and training to Member States; linkages with other information systems; coordination with other information programmes and projects; coordination of financial assistance to member states; and, evaluation mechanisms.* 7

9. With reference to the outputs of DEVSIS-AFRICA, the Team recommended that DEVSIS-AFRICA undertakes: cataloguing, indexing and abstracting; current awareness and retrospective bibliographic searches; selective dissemination of information; consolidation and repackaging of information; referral services; document delivery; and, advisory services to African countries on information and documentation problems.* 8

10. One of the most valuable contributions of the DEVSIS-AFRICA Prefeasibility Study was its analysis of the state of socio-economic development information and documentation in Africa at the national, subregional and regional levels. It could be safely assumed that the major conclusions arrived at by the Study Team at the time are still valid today. Among the conclusions reached upon analysis of information infrastructures at the national level, the following assume major importance: the diversity of the situation at the individual country level; the absence of national information policy-making organs; the absence and, in some cases, the ineffectiveness of legislations; the

* 4 Ibid.
* 5 Ibid.
* 6 Ibid.
* 7 Ibid., p.10-11.
* 8 Ibid.

scarcity of material, human and financial resources; the use of backward information processing, storage and dissemination methods; and, the low priority given to (or the exclusion of) information systems and services in national development plans.* 9

11. The Study Team was of the opinion that " a precondition for the establishment of any regional system is the assurance of an adequate level and volume of input from participating countries" and hence, "... the strategy most appropriate for establishing a regional system would be to provide member states with possibilities of building their national information infrastructures ..."*10

12. In addition, the Study Team identified the serious gap in information personnel needs and availabilities, particularly: the inadequacy of training facilities; the traditional library science approach adopted by most schools of information science; the severe shortage of middle-level specialists and technicians; the low status accorded to information personnel; and, the paucity of training opportunities in modern information handling techniques.*11

13. With regard to national information services, the Study Team concluded that the activities and outputs of existing centres were not usually geared towards meeting actual needs. Also, the fact that existing retrospective bibliographies and current awareness services have difficulties in supporting document delivery has diminished their usefulness. The Study Team also noted that the absence of standard policy on confidentiality of documents has acted as a barrier to the smooth inter-country exchange of information.*12

14. Concerning the state of socio-economic information infrastructure at the subregional level, the Study Team concluded that several subregional institutions possessed well established documentation programmes while others had plans to set up similar programmes in the future. Therefore the Team felt that they should be included as special participating centres for DEVSIS-AFRICA.*13

15. The Team further felt that African regional agencies should play a role similar to that of subregional institutions as special participating centres.*14

16. In its synthesis of principles and guidelines for the design and establishment of a Pan African information system, the Team discussed a host of issues including: the strategic value of

* 9 Ibid., p.21-24
*10 Ibid., p.25
*11 Ibid., p.25-26
*12 Ibid., p.28
*13 Ibid., p.29
*14 Ibid., p.33

information; the need to pool and share development information; and, the need for wide and equitable access to development information produced in the industrialized countries and other developing regions. In translating these principles into design features the Team concluded that a Pan African information system should promote the collection and preservation in Member States of all development information, including scientific and technological information; and, that it should attempt to obtain a wide spectrum of development information relating to countries and regions outside Africa through equitable and fair terms of exchange.*15

17. From the point of view of a systems development methodology the Team felt that a Pan African information system should make possible a full satisfaction of development information needs by enabling access to both numerical and non-numerical information. Moreover, the need for accurate, valid, comprehensive and up-to-date information was stressed.*16

18. Further to the quality issues mentioned above, the Team examined the "question of how to locate the different activities and components of the system both in space and time and how to organize each activity using the range of technological means and resources available ...". In this context, the decisions on where to place the responsibility for performing each of the activities (acquisition, processing, storage, retrieval and delivery of information) and what technologies and related equipment and personnel resources to use (manual or computerized processing, highly qualified vs. less qualified personnel, use of postal vs. telecommunication data transfer) figured prominently. Upon consideration of this factors it was recommended that a Pan African information system should ensure a rational division of work for the acquisition, processing and delivery of information. Also, it was recommended that the system "... should benefit from modern technology, ... and that it should try to cut down the delays and costs of information transfer by using the most efficient physical transport or telecommunication means."*17

19. Another important design issue considered by the report involves decentralization. It was stated that although centralization might result in substantial economies, decentralization, on the contrary ensures that the persons responsible for input and output are close to the sources of production and to the users of information. The main components of the decentralized system were identified as national participating centres on the one hand, and a coordinating centre that will serve as "... a component able to coordinate, harmonize, stimulate and support the functioning of the other components".*18

*15 Ibid., p.50-55
*16 Ibid., p.56
*17 Ibid., p.59-60
*18 Ibid.

20. As regards the implementation of the system, the Team recommended that a three-phase, ten-year programme be launched. The proposed phases were Phase I, 1979-81; Phase II, 1982-84; and, Phase III, 1985-89.*19

21. The Team also recommended that "... a computerized data base should be created by using the modified DEVSIS input sheet ... to ensure compatibility with other relevant systems".*20

22. As regards selection of computer hardware and software, the Team felt that "...preference should be given to programmes (software) which can be replicated at no cost to Member States" and it identified the ISIS, MINISIS and MILOR software as suitable choices. In light of these, the possible choices for hardware were:

a) if the ISIS software is chosen; IBM 360 or 370, RIAD ES Series, and AMDAHL,

b) if MINISIS software is chosen; Hewlett Packard 3000 series II, III or 33,

c) if the MILOR software is selected; any minicomputer that has a FORTRAN IV compiler.*21

23. In addition, it was stated that "... the selection of the system's computer for the first phase should not necessarily take into account the full operational capability required from phase III onwards ... and that a low-cost, high-performance (e.g. a minicomputer) would meet the needs for phases I and II of the project."*22

24. The following important conclusions that pertain to the present state of the PADIS programme can be drawn from the last several pages:

a. that DEVSIS-AFRICA shall be a mission-oriented information system for the development sciences;

b. that, DEVSIS-AFRICA shall operate within the broader framework of a Pan African information system and network;

c. that, a Pan African information system and network should enable access to both numerical and non-numerical information;

d. that, there is a need to assist member states to enable them to develop their information infrastructure

*19 Ibid., p.61-63
*20 Ibid., p.74-75
*21 Ibid., p.75-76
*22 Ibid.

with a view to enhance their participation in the proposed system;

e. that, improving the poor state of information and documentation activities in the African region requires a coordinated and comprehensive programme involving legislative, policy, educational and institutional action;

f. that, a Central Coordination Office, with a capacity to undertake active documentation work, be set up to implement a programme at the national, subregional and regional levels;

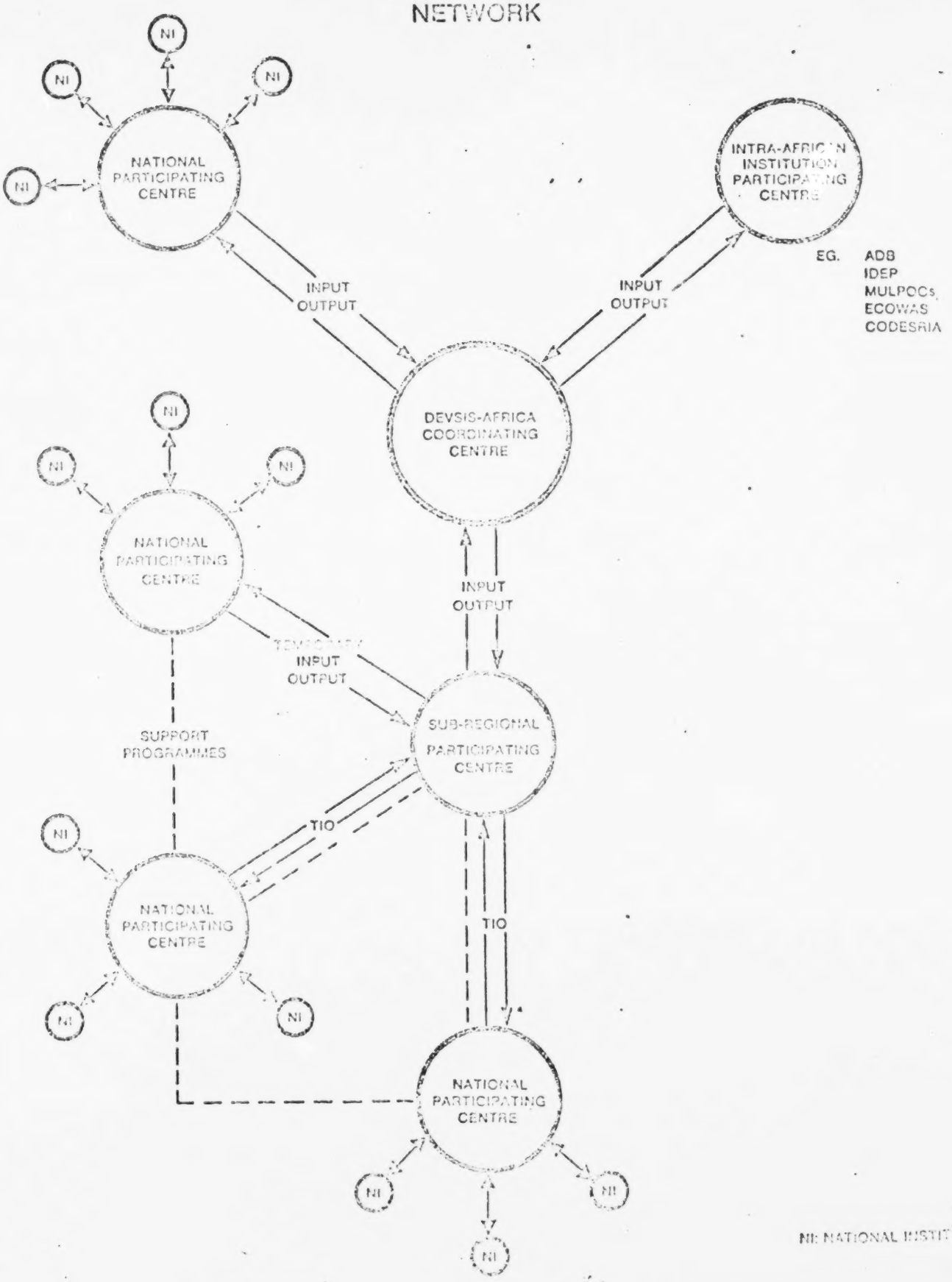
g. that, a Pan African information system and network should utilize up-to-date information gathering, processing and dissemination mechanisms and technologies that have a capacity to overcome the physical barriers to the smooth exchange of information; and,

h. that, the PADIS network should be based upon a rationally decentralized discharge of activities and responsibilities.

25. The illustrations on the next three pages provide some useful explanations on therelationships between DEVSIS-AFRICA, the Pan African information system and other international information systems and networks.*23

*23 Ibid., p.54, 72 and 73 respectively.

DEVSIS-AFRICA NETWORK



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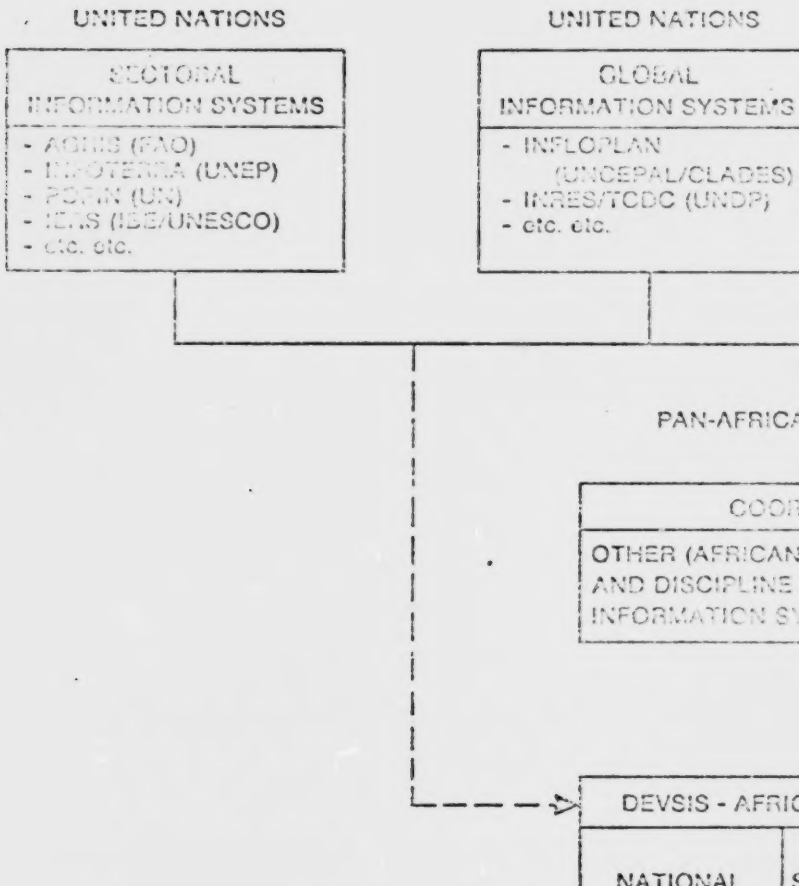

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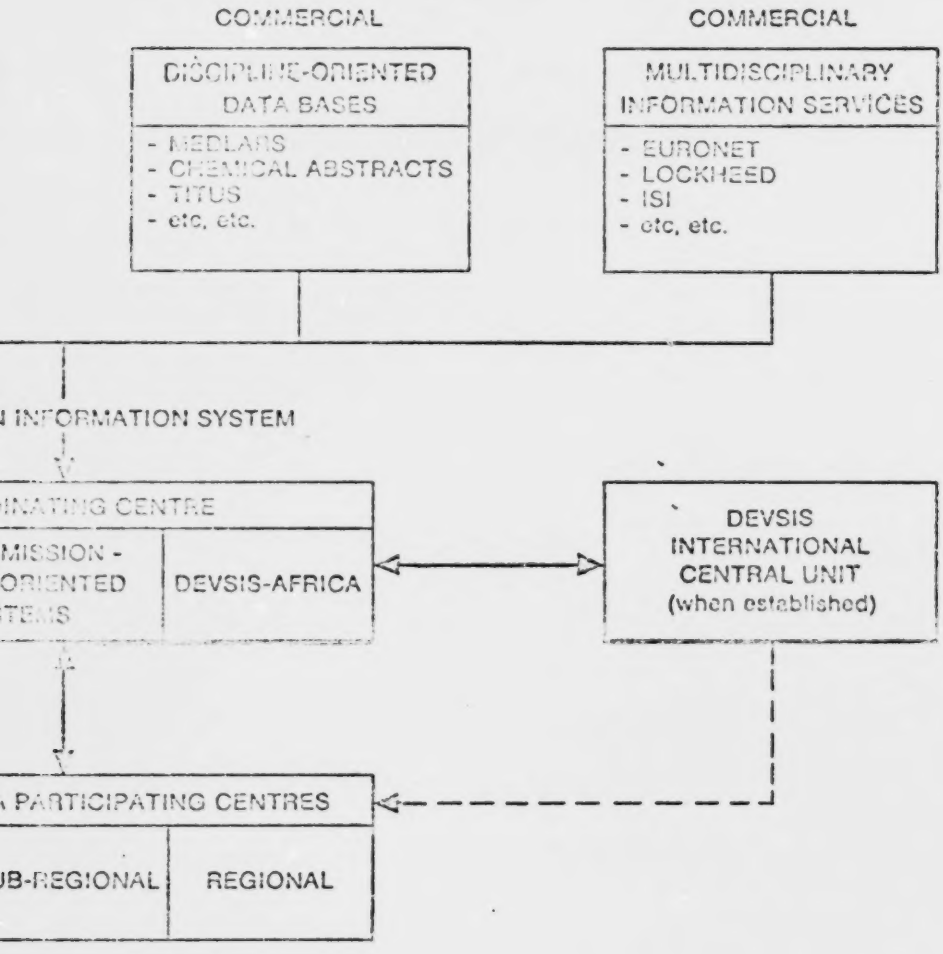

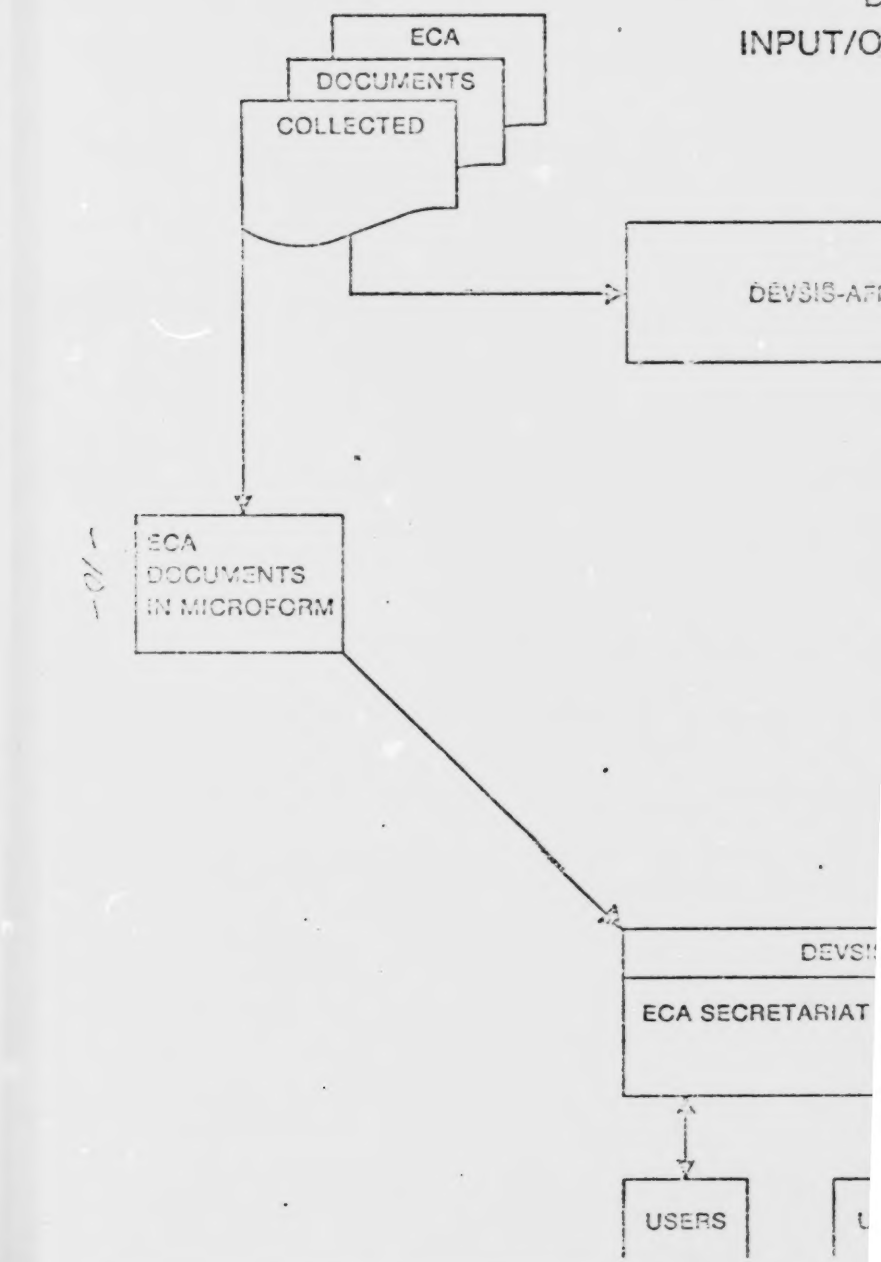
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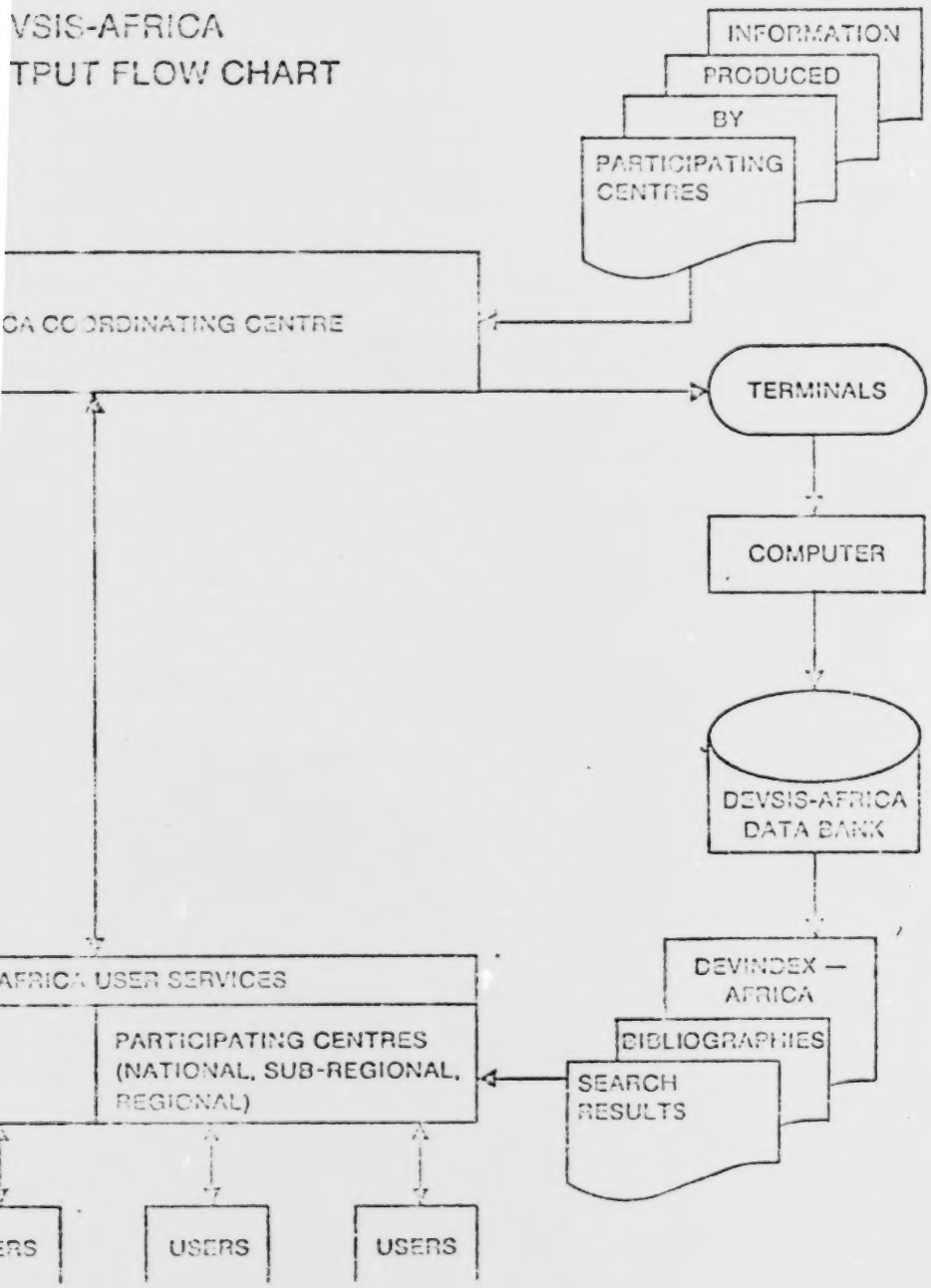

C. Implementation of the First Phase of the PADIS Programme

26. The implementation of the present PADIS Programme was officially commenced in January 1980 with the creation of the Central Coordination Office (CCO) of "DEVSIS-AFRICA".

27. In accordance with the recommendations of the DEVSIS-AFRICA Prefeasibility Study discussed over the last pages, the CCO was organized with a Computerized Documentation Section, Computer Operation Section and a Reprographic and Maintenance Unit. The activities of these organizational units was supervised by a Project Manager and a Chief Technical Advisor.

28. One of the preliminary tasks carried out by the CCO was the preparation of methods for the analysis of documents (cataloguing, indexing, abstracting) and for the preparation of bibliographic records. In this endeavour, due recognition was given to norms and standards developed internationally by UNISIST, DEVSIS and AGRIS. The resulting worksheet and manual for record preparation were used to analyze documents prepared by ECA in the discharge of its activities. These worksheets were in turn used to create the first PADIS data base on development literature (PADIS-DEV) using the MINISIS data base management tool and the HP3000 computer configuration.

29. Immediately following this activity, an Inter-agency Working Group Meeting on Compatibility with PADIS was organized to discuss, aside of technical compatibility issues, the goals set up by the management of PADIS to realize what the DEVSIS Prefeasibility Study referred to as the 'Pan African Information System and Network'.

30. The design document*24 prepared for the purpose was subsequently presented to, and endorsed by, the ECA Conference of Ministers at its Seventh Meeting held in Freetown, Sierra Leone in May 1981.*25 It was at this stage that the title "DEVSIS-AFRICA" was changed to "Pan African Documentation and Information System - PADIS."

D. Major Design Features of the Pan African Documentation and Information System (PADIS)

31. According to the design document mentioned above, the main objective of PADIS is "... to provide ready access to information for policy makers, technicians, planners, financiers and all others engaged in the economic and social development of African

*24 UNECA; Establishment of the Pan African Documentation and Information System: Progress Report and Future Work Programme; UNECA, November 1980; (E/CN.14/789, E/CN.14/TPC/. II/3); 24 p.
*25 United Nations; Economic Commission for Africa; Annual Report, April 1980 to April 1981; United Nations, New York, 1981; p.79-80.

States."*26 It was stated that this primary objective will be met through the following activities:

a) the establishment of a Central Coordination Office equipped with the capacity to collect, process and disseminate information;

b) the creation of a data base containing references to documents dealing with issues of concern to African economic and social development;

c) the creation of a set of complementary (sectoral) data bases;

d) the establishment of interconnections with international information networks;

e) the exploitation of the above mentioned data bases (a to d) to provide information in the form of microfiches and hard copies of original documents, printed indexes, etc.

f) the provision of assistance to Member States to strengthen their national information infrastructure with a view to establish a network of participating centres;

g) the dissemination of information among the network participants using the most recent data transmission technology; and,

h) the organization of requisite training programmes.*27

32. It should be noted here that the above activities were formulated in furtherance of the design features elaborated by the DEVSIS Prefeasibility study discussed in the last section. Another point worth noting here is that DEVSIS-AFRICA, dealing with mission-oriented, development information, has now become one of the components within the broader framework of PADIS. The other major components of the PADIS system are the set of sectoral, complementary files (referred to in PADIS documents as PADIS-COM) and the information to be acquired through interconnections with international information networks.

33. In the implementation of the PADIS programme, the recommendation of the DEVSIS-AFRICA prefeasibility study to adopt a three-phase, ten-year programme was maintained. In this connection the design document, and the programmes contained therein as endorsed by the ECA Conference of Ministers at its Seventh Meeting, states that:*28

*26 UNECA, 1980; p.2.
*27 Ibid.
*28 Ibid., p.4.

"Phase I, 1980-81, to be devoted to the creation of the Central Coordination Office (CCO); setting-up of PADIS basic methodologies; installation of the PADIS/CCO computer centre; preparation of an index to development information contained in the PADIS data-base; training of personnel and users; and, design and implementation of a telecommunication link between PADIS/CCO and the EURONET network through the European Space Research Information Network (ESRIN) at Frascati, Italy.

Phase II, 1982-84, to be devoted to the implementation of an integrated data bank including Pan African sectoral files; training of personnel of collaborating centres; installation of computer centres at the level of MULPOCs; design of a telecommunication network using satellite technology; design of input-output centres at the national level equipped with computer facilities and satellite communication stations; organization of a training plan for participating centres; and, design and implementation of a powerful computer centre for the PADIS/CCO.

Phase III, 1985-89, to be devoted to the installation of the PADIS system and network including input, output and storage devices at subregional and national levels; full exploitation of the PADIS network and its extension to all African countries; organization of input and output procedures; and, the organization of training programmes."

34. Concerning the territorial subdivision of the region into sub-regions, the design document featured five groupings, namely, Central, Eastern, Northern, Southern and Western Africa. It was also stated that the implementation of the PADIS programme will be "... realized by extending the system throughout the African continent via the PADIS subregional offices."*29

35. Concerning the financial outlays required to implement the total programme, the document estimated a cost of US$ 160 million.*30

36. Concerning the services to be provided by the PADIS system the design document enumerated the following: current awareness service through printed indexes; question and answer services; and, selective dissemination of information-all three services to be supported by either document delivery or a referral service. Concerning the interrogation of remote data bases it was stated "... the fastest available means (mail, telex, etc) should be utilized" with the understanding that "an advanced data transmission system ..." is required to enable remote tele-interrogation

*29 Ibid., p.5.
*30 Ibid., Annex II.

and tele-data transmission at a later date.*31

37. The tele-data transmission proposals for the PADIS network envisaged an interconnection both within Africa and between Africa and other regions. The categories of data to be transmitted were identified as (a) the interactive interrogation of data bases; (b) the printing, on a local printer, the results of interrogations; and, (c) the transmission of original or full text documents selected as a result of (a) and (b) above. Facsimile and/or digitalized high speed transmission methods have been cited as possibilities.*32

38. Concerning sources of funding, the document cited African Governments; multilateral agencies such as UNDP, ADB, the World Bank and IDRC; and bilateral agencies such as EEC and other developed countries' Governments as prospective donors. African Governments were expected to furnish 10% of the total estimated ten-year budget of US$ 160 million, or approximately 20% of the estimated budget for Phase III, 1985-89.*33

E. Main Design Features of the Second Phase of PADIS, 1982 - 84

39. As discussed earlier the First Phase of the PADIS Programme was mainly concerned with (a) the realization of DEVSIS-Africa including the establishment of the Central Co-ordination Office, the installation of equipment, the recruitment and training of personnel, the setting-up of data bases, and the publishing of indexes to development literature; and, (b) the preparation of design documents oriented towards the realization of the Pan-African Documentation and Information System and its network.

40. In addition to the design document discussed in Section D above, several documents that outline the principles, plans and programmes for the implementation of the PADIS system and network were prepared in the course of 1981. The most comprehensive and illustrative of these was the Project Document for the UNDP Inter-country Project entitled "Creation, Establishment and Consolidation of PADIS - Phase II".*34

41. In the discussions on 'immediate objectives' and 'workplan' of the above mentioned project, two new features that concern the 'Pan African Statistical Data Bank' and the 'Referral Information System for Technical Cooperation among African Developing Countries' have been incorporated. With the incorporation of these components the information scope of the PADIS system had reached its present limits.

42. The following activities and corresponding outputs were

*31 Ibid., p.6.
*32 Ibid.
*33 Ibid., Annex II.
*34 UNDP; Creation, Establishment and Consolidation of PADIS - Phase II; (1981), 21 p.

expected of the Second Phase of the PADIS Project:*35

a. Strengthening of the Central Co-ordination Office of PADIS to enable it to cope with its greatly increased responsibilities;

b. Expansion of the development information data base (PADIS-DEV) and the creation and/or expansion of sectoral bibliographic files (PADIS-COM);

c. Designing and implementing an integrated numerical data bank;

d. Designing and implementing a referral information system in support of technical cooperation among African countries;

e. Establishing interconnections with international information networks;

f. Exploitation of information resources available through b,c,d and e above to meet user needs through printed indexes (current awareness), retrospective searches on demand, selective dissemination of information, etc. as well as clearing house activities.

g. Designing a Pan African data transmission network utilizing the most recent technology;

h. Assisting Member States in strengthening their national information infrastructure, particularly in the creation and development of their national centres;

i. Organizing training programmes, at all levels, in support of all the above activities;

43. The amount of financing approved under this UNDP Project was US$ 2.78 million out of which $1,200,000 was earmarked for personnel; $440,000 for training; $370,000 for expendable equipment and supplies; and, $766,500 for nonexpendable equipment.*36

F. Implementation of the Second Phase Programme of PADIS, 1982 - 1984: A Summary *37 *38

44. Concerning the strengthening of the Central Co-ordination Office, significant achievements have been made particularly in enlarging the size and quantity of staff resources and in

*35 Ibid., p. 2-7.
*36 Ibid., Annex II
*37 See background documents on other agenda items for a more detailed account.
*38 The order of presentation here follows, for ease of reference, the order of activities presented under paragraph 41 above.

expanding the computing and storage capacity of the Computer Centre. Regarding the former, the CCO possesses valuable expertise in the team of data processing specialists, documentalists, bibliographic data base managers and reprographic technicians it employs. In addition to their regular duties at the CCO, these staff have proved valuable in delivering training courses in their respective competences; in assisting the development of norms and methodologies and in testing them; in providing advisory services; etc.

45. The hardware/software mix installed at the CCO Computer Centre have been proved suitable for the treatment of both bibliographic and statistical information. Application programmes development for the PADIS statistical data bases (being implemented under the leadership of the ECA Statistics Division) is a further testimony to the versatility of the equipment.

46. The CCO has accumulated a vast and unique experience in the course of its efforts to establish its own active documentation system and in its endeavours to assist Member States to set up their national centres. Although the great diversity in national situations would always present a fresh challenge, the CCO is, more than ever before in a better position to discharge its responsibilities in an effective manner. The fact that the CCO is now receiving a growing number of requests for opinions, advise and assistance on proposed programmes in the information and documentation field from Member States, United Nations Agencies, non-governmental and inter-governmental agencies signifies that it is indeed filling an important gap that would have otherwise remained a barrier to further developments in this field.

47. Concerning the expansion of the development information data base that was created with the commencement of the DEVSIS-AFRICA Project (PADIS Phase I) in 1980, significant progress has been achieved with the increasing size of the file (c. 5000 records in 1984) as well as with the diversification of the document sources. The data base now contains records that were prepared at ECA as well as those that have been prepared in cooperation with documentation centres in Botswana, Guinea and Niger.

48. As regards the acquisition of sectoral bibliographic files to be made available to African users through the CCO, two United Nations bodies, the ILO and the United Nations Department for International Economic and Social Affairs, have put subsets of their respective data bases at the disposal of the PADIS/CCO. These data bases are available for online interrogation and their conversion to PADIS formats has been extremely smooth.

49. The design of the numerical component to be composed of, ultimately, a statistical data bank and other relevant numerical but non-statistical data banks has been, relatively, a more time and resource consuming exercise. The statistical data bank, designed in three levels of data bases integrated into one system of information, is being executed under the leadership of the ECA

Statistics Division. The work on level I and II being substantial has been delayed due to lack of resources. The work on the level III data base is progressing. It now contains over 60,000 time series statistical data on social, demographic, economic and foreign trade statistics. Each data entry contains numerical values for up to 21 years. The level III data base is currently available online for internal users and the ECA Statistics Division has produced the African Statistical Yearbook parts I and III entirely from this data base. The system design, structure of the data bank and the progress of the work is contained in the report PADIS-STAT.

50. The referral information system in support of technical cooperation among African countries was included as a subsystem of the PADIS system in the course of 1982. The activities of this component were executed using a special grant put at the disposal of PADIS by UNDP as part of its worldwide programme to accelerate technical cooperation among developing countries (TCDC). This component will ultimately give rise to a range of integrated data bases on available African expertise, institutions and research and development projects. Until now, the personnel data of about 8,000 experts has been collected and compiled using data collection forms prepared at PADIS. The forms have been further processed to enhance computerized storage and retrieval. The first volume of the Directory of African Experts has been published and its four supplements are under print.

51. Establishing interconnections with international information networks for the purpose of making available to African users information generated in the industrialized world and that is of relevance to African development has been under consideration. This interconnection has been frequently confused with the data transmission network plans of PADIS which aim at the fastest possible method of information transfer between participating centres of the PADIS network as described below. An experiment has been conducted in collaboration with the European Space Agency (owner of the European Space Research Information Network) using a dial-up terminal installed at PADIS/CCO in Addis Ababa and a normal telephone line. The outcome, although unsatisfactory due to the low speed of the channel and the frequent intervention of PTT operators, has demonstrated possibilities for interconnections at a slightly enhanced level. In addition, the European Space Agency, upon the request of the ECA Executive Secretary had approved access by the PADIS/CCO to the ESRIN data bases free of charge for a period of six months. This access has not been realized due to the exorbitant rates demanded by the Ethiopian and Italian PTT administrations.

52. The information resources currently available at the CCO as described earlier consist of bibliographic data bases, the statistical data bank and the computerized version of the Directory of African Experts. The contents of the development literature database (PADIS-DEV) is brought to the attention of users by the publishing of DEVINDEX-AFRICA, four annual issues of

which have been printed to-date. User requests (on average 200 per year) emanating from the DEVINDEX-AFRICA have been serviced with the provision of mostly photocopies although PADIS maintains microcopies of documents cited in the DEVINDEX. User services on the statistical data bank to the general public have not commenced as yet due to the incompletion of the preparations. The Directory of African Experts has been widely circulated but its utilization has not been assessed partly because feedback mechanisms have been difficult to establish.

53. The establishment of a data transmission network using up-to-date technologies, including satellite communication has been the most controversial aspect of the PADIS Programme. The idea to use such an expensive and technically as well as managerially cumbersome method emanates from the poor state of the other communication mechanisms that operate in Africa today such as slow and unreliable postal, telex and telephone services. This reality has, perhaps prematurely, induced the management of PADIS to propose a tele-data transmission network based on satellite technology. The most significant work conducted in this direction constitutes the identification of the categories of information to be transmitted and to project (using data traffic estimation methods developed by the European Space Agency) possible data traffic growth among African countries.*39 Given the extremely scanty or nonexistent data on data traffic at present, one is forced to question if there was a better method to do so. Moreover, the study prepared by PADIS provided estimates for on-line and off-line channel capacities including the capacity required for full-text or primary document transmission.*40 Subsequently, a number of consultations were conducted with experts in the field who have provided a diversity of opinions. These opinions are dealt with in the background document on the agenda item concerning the PADIS data transmission network.

54. Assisting Member States in strengthening their national information structure has not been a simple task either. The factor most responsible for the difficulties encountered by PADIS in this area is the lack of priority information and documentation activities are given in national development plans and strategies. The initial action taken by PADIS in this connection was to sensitize African Governments on the need for and the benefit to be derived from strengthening national information infrastructure. The sensitization took the form of model project documents that described the objectives, activities and outputs of hypothetical national centres. This effort was subsequently coupled with field missions by PADIS staff to the majority of African countries. Presentations by PADIS at numerous meetings sponsored by the ECA and other African organizations have, more often than not, stirred discussions and debates which have

*39 UNECA/PADIS; Report on the Preliminary Technical Specifications of the Planned Communication Satellite System for the Pan-African Data Transmission Network; March 1981; 39 p.

*40 Ibid., p. 24-29.

contributed to increased public awareness. However, the response of Member States to these stimulations have been slow and in the best of situations, they were not as dynamic as one would have expected. Nevertheless, a higher degree of realization is observable and in some cases concrete results are being achieved in Benin, Botswana, Niger, Guinea, the Sudan and Zambia. Evidently, the above discussions are not applicable to Member States of the North African region where developments in the information field have reached a higher order and where needs have evolved accordingly.

55. Along with the evolution of PADIS, the creation of subregional information and documentation centres has been gaining relevance within the PADIS Programme. In earlier studies, such as the DEVSIS-AFRICA Report, the role of subregional centres was equated with subregional institutions and organizations that should be integrated into the PADIS System as special participating centres. More recently, the trend has been towards the establishment of 'subregional coordinating centres' or 'subregional information and documentation centres' within the aegis of PADIS. Most documents prepared by PADIS including the preliminary study on the data transmission network have accorded important roles to the subregional centres whereas some expert opinions for various reasons have questioned their contribution in advancing PADIS aims. Nonetheless, PADIS was in the process of establishing subregional centres for the Western and East African subregions at Niamey and Lusaka respectively until current resource limitations forced their postponement. Instead, the equipment purchased for the purpose of these subregional centres will be put at the disposal of the Governments of Niger and Zambia to enable them set up their national centres with further technical assistance from PADIS. These national centres will in the meantime, and until PADIS resources permit the setting up of subregional centres, provide services for emerging information and documentation systems in the respective subregions. In the North African subregion, the Member States have opted to postpone the creation of a subregional centre until a suitable study is conducted.

56. The existence of a sound training programme has been considered a prerequisite to the implementation of the PADIS Programme at all levels. The nature of the PADIS Programme necessitates the provision of training in documentation, data base management and computer operation for the development of medium-level technical cadres. Equally important is the provision of professional training for the management of information and documentation systems including: design, development and operation of systems; management of computer centres; maintenance of norms, standards and methodologies; etc. At the specialists level there is a growing need for software and hardware engineers; telecommunication engineers; documentation and information scientists, etc. PADIS has been providing on-the-job training to a selected number of countries and institutions at the medium and junior professional levels. The training courses which lasted an average of four weeks emphasized practical work.

Special consideration was given to preparing staff members of prospective national centres as was the case with Benin, Botswana, Guinea and Niger. Apparently, it is beyond the capacity of PADIS to provide high level specialist training.

G. Critical Opinions Expressed by Individual and Groups of Experts on the PADIS Programme

57. Right from the stage of conception, the design and execution of the PADIS Programme has relied heavily on the work and advice of distinguished experts in the field of information and documentation. These technical experts had brought with them a wealth of knowledge and experience which has contributed in shaping the Project towards its present function and scope. Moreover, the fact that these experts were drawn from institutions and organizations that support and promote one type of or another information and documentation activities has aided the consideration of a broad range of principles and approaches prior to the formulation of the Project.

58. Secondly, PADIS being a Programme executed by the UNECA, has sought and acquired the support and guidance of Member States through the ECA Conference of Ministers. The Conference of Ministers had at its last six consecutive meetings considered a progress report and endorsed appropriate resolutions on PADIS. This is a clear indication of the degree of control placed in the hands of the Conference of Ministers and its subsidiary organs. It was by virtue of this control that the Conference of Ministers, upon the recommendation of the Conference of African Planners, Statisticians and Demographers, felt the establishment of a Regional Committee for PADIS a necessity.

59. Equally importantly, the ECA Executive Secretary has, on several occasions, invited external experts to consider and advise upon the programmes drawn up to execute the PADIS Project, the most notable of which are the "First Interagency Technical Experts Working Group on Compatibility with PADIS" and the "First PADIS Intergovernmental Meeting of African Computer, Documentation and Information Scientists." Also, several individual and groups of experts, with or without official function, have been received at PADIS whose observations have produced some valuable ideas.

60. The last three paragraphs provide indications that the PADIS Project has not suffered from a lack of expert advice or from a lack of control that is commensurate with its status.

61. Further, it is felt it will be rewarding for the members of the Regional Technical Committee to have an overview of the critical opinions expressed by experts on PADIS. The intention, here, is not to argue the validity of these opinions; some can be disputed effectively. Those that arose from inadequate clarifications should have found answer from the last several pages. More importantly, the relevant critical opinions will

help to rethink some of the fundamental issues and, with proper attention, will lead to the identification of the most suitable options and approaches.

62. One of the most common observations expressed by experts was that, "the PADIS Project was very ambitious in scope and therefore included a high element of risk, commensurate with its importance and with the needs to be met ..."*41 A similar opinion was expressed by J. Cazemajou of Satel Conseil: "PADIS seems to be an ambitious project which will encounter a lot of difficulties..."*42 Another expert, W.O. Aiyepeku of Ibadan University attached the ambitious nature of the Project to "... the negative impact of weak or nonexistent information infrastructure at national and subregional levels" and the substantial technical and financial assistance required.*43

63. Several experts were of the feeling that the implementation of the PADIS work programme suffers from insufficient and thorough studies. Others have remarked that "... the design documents of PADIS are not coherent and do not continue to elaborate the issues raised but remain unfinished by the DEVSIS report."*44 Some experts considered that "the study of various documents revealed contradictions in the objectives of the PADIS System, which aimed to be multidisciplinary and thus sometimes overlapped with other existing systems."*45 Other experts emphasized that the documents did not contain the same concepts, which led to changes in objectives. They considered that "vagueness in the concept and objectives, as well as the fact that Member States had not participated in the fundamental technical choices had led to questionable choice of hardware and software."*46

64. Contrary to the above a team of experts from the French Ministry of External Relations have concluded that:

> "... Without any means in the initial phase, confronted with entirely new technologies, the promoters of PADIS have not adopted the classic method which consists of preparing a series of technical and economic studies on

*41 UNECA/PADIS; Report of the First United Nations Interagency Working Group on Compatibility with PADIS; April 1981, p.24.
*42 J. Cazemajou; Mission Report on PADIS; Satel Conseil; January 1983; P. 8.
*43 Aiyepeku, W.O.; International Socio-Economic Information Systems: An Evaluative Account of DEVSIS-Type Programs; IDRC, 1983; p.39.
*44 Tahar, Ayouz; Rapport Special sur le Systeme d'Information Pan Africain (PADIS) Initie par la Commission Economique pour l'Afrique (CEA) pour un Montant Global Estime a 170 Million de Dollars E.U. Alger; Avril 1984; p.6.
*45 UNECA/North African MULPOC; Report of the Meeting of Experts on the Establishment of the North African Documentation and Information System; Tangiers; March 1984; p.4.
*46 Ibid.

prefeasibility, feasibility, etc. They deliberately adopted an approach which was at the same time political and pragmatic by launching an offensive ... and by proving the movement while walking ... considering the multidisciplinary, multidimensional and multilateral nature of the Project; considering also the political and administrative context in which it is inserted... one can think that this very concrete and at the same time very political approach was the only way to give birth to PADIS. The ten previous years had, in fact, given the proof that procedures and usual practices condemn to immobilization those responsible for such an ambitious task.
task.*47 *48

65. Several experts voiced the need for " ... the assistance of a technical committee of experts to guide ..."*49 the activities of PADIS. One expert has recommended the creation of two committees; one to guide the conception and design of PADIS; and another responsible for the implementation aspects.*50 Others were more concerned with the manpower capacities of the PADIS Project: "It is illusionary ... to believe that the Project can continue with the sole human and financial resources it possesses today ... The support of a team of technical and higher cadres with respective competence sufficiently rich to conceive all the developments to come and their details, as well as to lead to its successful end the implementation of the first concrete operations ..." is required.*51

66. The concerns regarding the data transmission network aspect of PADIS have been both of a policy and technical nature. This common concern was expressed by the group of experts from North African countries as "... PADIS was based on an unrealistic broadcasting network which had led to technological choices relating to communications which were not adapted to African reality ..."*52 Another expert considered the issue as "an unhealthy, early orientation toward heavy telecommunications which was capable of diverting scarce resources from the clear and worthwhile objectives identified in the system design".*53

67. The technical observations made to-date on the data transmission plans of PADIS are most conclusively analyzed by the French Appraisal mission as follows:

*47 Biraud, Gerard et al; Report of the Appraisal Mission on the Pan African Documentation and Information System; French Ministry of External Relations; January 1981; p.46
*48 Ibid., p.59.
*49 UNECA/North African MULPOC; p.5.
*50 Aycuz Taher, p.8.
*51 Gerard Biraud et al; p.60.
*52 UNECA/North African MULPOC; p.4.
*53 Aiyepeku, p.39.

"... basic distinction should be made concerning the bibliographic component between the transmission of bibliographic data (author, title, abstract, etc.) and the transmission of original or primary (full text) documents...[in the former] access to the user is not immediate and it assumes that the user obtains afterwards the selected work or works from a local library or by ordering it by mail from the publisher or from PADIS itself... But the user of such a system would remain tributary of the delays and hazards of the postal systems and for the order, dispatch and payments. The delay [could be] a month or more before the document is delivered. [According to PADIS plans, it was] considered to transmit fully the original documents through teletransmission (mass traffic). This procedure would have the tremendous advantage of freeing the user from all postal delays ....But, it encounters two major obstacles: (1) the number of documents to be reproduced in this manner will in any case remain limited (and) would very likely concern the selection made by PADIS-DEV; and, (2) such a transmission system would represent a considerable financial input [due to] the very different nature of memory capacities and transmission power ... Supposing, the option for teletransmission of primary documents is to be seriously considered, it would require a complete study of its technical and financial implications...This in no way implies the reconsideration of the justifications and the validity of the objectives in terms of the objectives of the project...*54 In terms of feasibility the techniques have reached a level appropriate for data transmission support... the evolution of technology and the simultaneous reduction of costs make it possible to conceive a generalized usage...*55

68. Although most critical opinions focus on the overall design of the PADIS System and its network aspects, some comments have been expressed on its numerical component as well. One comment made by the French Appraisal Mission relates to

"... the description of the project objectives suffer from a primary ambiguity: it had to be able to cover either a network of bibliographic data bases, or on the other hand, a network of numerical data banks"*56 and continues to warn that "even if the objective is perfectly justified, it should be applicable to sets of data strictly inter-comparable. For a bank that claims to concern the different services of one state, the different states of one region and, finally, the different regions of the continent, the greatest diversity of definitions, catalogues, calculation conventions, etc.

*54 Gerard Biraud et al; p.30-33.
*55 Ibid., p.36.
*56 Gerard Biraud et al; p.29.

> should be expected. Finally, the numerical data bank component presents the same advantages and the same justifications as the bibliographic components. It undoubtedly provides a unique occassion to intensify the efforts conducted for the improvement of this device, and as such, deserves to be undertaken."*57 *58

69. The choice of the hardware and software for the processing of data has drawn equal attention. Ayouz Talar concludes that the choice of technologies suffers due to the insufficient involvement of African experts. The expert meeting that was convened by the North African MULPOC held a similar view: "... the fact that Member States did not take part in the fundamental technical choices had led to questionable choices of hardware and software."*59 Another concern was " . the capacities of this centre are those of a minicomputer [which] could hinder the development of PADIS-DEV and PADIS-COM, users being confronted with problems of access and response time which become prohibitory"*60 The opinions and recommendations of the DEVSIS-AFRICA Study Team and that of M. Pobukovsky, were strictly to the contrary.*61

70. The financial implications of the PADIS Project and the assurances of its funding were undoubtedly a critical concern:

> It is doubtful that all of them [the funds] will be realized and that they will be realized within seven years (1983-1990). The cost of the installations will strongly depend on the technologies which will be used and [which are] very rapidly progressing. ...The most unsure element of the provisional budget is the launching of a communication satellite. As for the African States whose budget is fixed arbitrarily at the global contribution of 10 percent of the total cost, we suppose that they will be ready to incur certain expenses and staff for their own centres, but we suppose that only a few will be willing and capable of contributing to the operation of the central service, in any case not before seeing the results of Phase I.*62

71. The above opinion is also shared by the experts meeting which "drew attention to the administrative and financial implications of the establishment and development of a system to be financed partly by Member States, with a contribution provided by some non-African countries and international agencies, which could not commit resources until the intentions of the African

*57 Similar remarks were expressed by Ayouz Talar, p.6.
*58 Gerard Biraud et al; p.36; p.57.
*59 UNECA/North African MULPOC; p.4.
*60 Gerard Biraud et al; p.49.
*61 Pobukovsky, M.; Software/Hardware Requirements concerning the PADIS Coordinating Centre; March 1980; 143 p.
*62 Gerard Biraud et al; p.67.

States had been clearly expressed. ... The scale of the investment meant that PADIS must be carefully planned in order to be credible which is a prerequisite for procuring funds".*63

H. Conclusion

72. Some important conclusions can be drawn at this stage. Firstly, the cornerstone for the design and implementation of the PADIS programme was laid down by the Interagency Study Team that prepared the feasibility report on DEVSIS-AFRICA. The wide-ranging recommendations contained therein have been, without any major deviation from the initial goals, progressively elaborated resulting in the present scope and function of the Project.

73. Secondly, the PADIS programme is admittedly an ambitious one in the sense that it has far-reaching implications for the development of the continent as well as tremendous difficulties for those who participate in its execution. This ambitious nature shall not be interpreted to mean mere dreams because there are sufficient tangible indications that the goals, however remote and difficult, are attainable with proper management and planning, adequate financial resources and with a sufficiently knowledgeable technical cadre.

74. Thirdly, it should be accepted from the outset that PADIS is a "frontier" project in three major ways : one, the objective situation in africa with regard to information and documentation infrastructure offers very little to enable building upon it or to modernize it. Secondly, the principles, methods and mechanisms, and particularly the technologies that need to be implanted to bring about change are of fairly recent nature even in the relatively advanced developing regions. Thirdly, the Project's aims and tasks have very few, if any, precedences with similar dimensions. Therefore, the need for flexibility, determination and innovativeness.

75. Fourthly, there are a lot of technicalities that will have to be worked out as practice takes over from theory and planning. Some of these technicalities are not readily perceptible such as the issues of data transmission; the confidential nature of certain information; and, the effects of copyright conventions - just to name a few. Certainly, there is a need to rethink and to examine in greater detail and with a view to identifing more alternatives the tele-data transmission aspects of the Project. A balance should be kept between unnecessary delays and, particularly undue haste since new, less costly, more productive alternatives are coming into the picture with the acceleration of technological development in the informatic-teleratic field.

76. The above will have meaning only if success is attained at the national level which is in turn determined by the political and financial committment of Governments; the degree of bilateral

*63 UNECA/Northern African MULPOC; p.5.

and multilateral technical and financial assistance; and the effectiveness of the lead role PADIS plays.

77. Success at the national level can be atained only if a persistent, relentless and methodical action is applied at the grassroots level; in documentation centres of ministries, research and teaching institutes, in public and specialized libraries. This task will have to be carried by trained and dedicated personnel under the guidance of a national lead agency. The priority task of PADIS shall be to assist in the proliferation of such agencies.

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ESTABLISHMENT OF A REGIONAL CO-OPERATIVE INFORMATION SYSTEM

4. Establishment of a Regional Co-operative Information System

1. The PADIS project was conceived in April-May 1980 to provide a technical response to the needs expressed by African countries for the establishment of a continental co-operative system providing access to the information needed for the development of Africa.

2. In order to process (collate, analyse, store and distribute)the various types of information required (numerical and non-numerical) a system of data bases was envisaged within the project, comprising sub-systems and sub-system "components", as described below.

3. This structure of sub-systems and components was designed in 1980 to simplify the establishment of international co-operation agreements on the various aspects and types of information to be processed and to identify bodies likely to participate in the PADIS project in Africa, in keeping with their responsibilities and functions. The structure of the system was finalized during the period 1981-1982 on the basis of all requests expressed by member States made either directly to the project Management or indirectly through ECA substantive Divisions.

4. By the end of 1982, the global structure envisaged for PADIS was as follows:

5. (a) PADIS bibliographic references sub-system comprising:

(a.1) - PADIS-DEV, a bibliographic component concerning development sciences (originally called DEVSIS-Africa), managed by the Central Co-ordination Office of the Project (PADIS/CCO);

(a.2) - PADIS-COM, a component consisting of all the bibliographic data bases prepared by the competent bodies at international, regional, subregional and national levels, collected and

made available to member States with the agreement of the Organizations responsible for producing the data (sectors not covered by PADIS DEV).

6. (b) PADIS reference and descriptive data sub system comprising:

(b.1) - PADIS-CORE, a component concerning analytical descriptions of experts, institutions and activities connected with African countries, carried out under the programme for Technical Co-operation Among Developing Countries (TCDC)

(b.2) - PADIS-PROM, a component comprising detailed descriptions of projects related to development in Africa along with their management and monitoring (work plans, budgets, etc.).

7. (c) PADIS sub-system concerning numerical and quantitative data comprising:

(c.1) - PADIS-STAT, a component consisting of a statistical data base prepared by the ECA Statistics Division;

(c.2) - PADIS-TEND, a component concerning a quantitative technical data base on products concerning the African market to be drawn-up in accordance with specifications provided by the ECA International Trade and Finance Division.

8. (d) A sub system comprising all the data bases which can be made available to African countries through agreements under the PADIS project, particularly in the field of scientific and technical information.

It consists of a single component:

(d.1) - PADIS-STISD, all the scientific and technical data bases deemed useful for development in African countries.

9. As at 20 February 1985, the PADIS system had reach the following stage of implementation:

- PADIS-DEV, A department called the Computerized Documentation Section CDS has been set-up in the PADIS Central Co ordination Office (PADIS/CCO). A 5,000 item bibliographic file which can be accessed on-line by the MINISIS conversation mode software. Agreements have been made with Guinea, the Niger the Botswana on the supply of information to the PADIS-DEV data base. This data base has been used to print specialized indexes (DEVINDEX). There is an on-going programme to microcopy (on microfiches) all the primary documents contained in the PADIS-DEV base.

- PADIS-COM. Agreements have been made with the International Labour Office (ILO) and the United Nations Department of International Economic and Social Affairs (UNDIESA) to feed into the PADIS data-processing system the ILIS and DIS bibliographic data bases produced by those bodies. This input has not yet been entered in the files by MINISIS because of the lack of necessary disc space.

- PADIS-CORE. A section called PADIS/TCDC has been set up in the PADIS/CCO and a reference file listing 8,000 African experts is available and can be accessed on-line with MINISIS.

- PADIS-STAT. A data analysis and production unit has been set up in in the ECA Statistics Division. The PADIS-STAT statistical data

base is operational and has 60,000 chronological statistical sets of social, demographic and economic data as well as data on foreign trade. The software (IMAGE 3,000) and hardware was supplied by the PADIS Computer Centre.

- PADIS PROM, PADIS-TEND, PADIS-STISD. These components have not yer been established due to lack of personnel and adequate funds.

10. The PADIS system is based on the following technical principles:

- A very clear distinction is made between the types of information to be processed and appropriate components for the system are created;

- The preparation of data bases for each component is in keeping with any existing international standards;

- Collection of primary documents on microfiches covering the documentary units analysed by PADIS bibliographic files will be gradually constituted in order to form the nucleus of an African clearing-house for primary documents

- Agreements between PADIS and all organizations of the United Nations system having operational programmes in the documentation and information fields will be established;

- Co-operation machinery between member countries will be studied in order to set up, progressively, networks (in the broad sense) for information collection, analysis and dissemination;

- A study will be made of the need to establish subregional centres as decentralized infrastructures for the Central Co-ordination Office (PADIS/CCO), in agreement with member States and in accordance with their wishes;

- Appropriate plans for the training of specialists will be made;

- A Pan African information dissemination network project will be prepared.

11. These general technical principles are the automatic outcome of the DEVSIS Africa feasibility study as incorporated and amended in the document on the Pan African Information and Documentation System (PADIS) which was submitted and approved at the seventh meeting of the ECA Conference of Ministers in Freetown, Sierra Leone in May 1981.

12. On the basis of these principles, the PADIS immediate objectives were clearly defined as set out in document 3.1, paragraphs 38/42.

13. The general work plan for the PADIS project consists of the following three phases:

- Phase I (1980 1981), comprising the establishment of PADIS/CCO and its interconnection with the EURONET network through the ESRIN centre at Frascati;

- Phase II (1982-1984), aimed as developing the various components described above, increasing the capacity of the PADIS/CCO Computer Centre and preparing the preliminary project for the PADIS-NET network;

- Phase III (1985 1989), constituting the final establishment of the PADIS system and PADIS NET network to ensure participation by the maximum number of member States from the African region.

At the present time, (February 1985), designated for commencement of phase III, the system and network have reached the following stage:

- The system: PADIS/CCO and its computer centre are ready. Four components (DEV, COM, CORE and STAT) out of the seven planned for the programme (DEV, COM, PROM, CORE, STAT, TEND and STISD) are finished or currently under way. It is essential to increase efforts to finish the components in progress and to complete the entire programme.

- The network: The project to establish a telephone interconnection with networks and information systems outside Africa (for example, EURONET) has not gone beyond the preliminary study stage, in view of the technical difficulties entailed in such an ambitious projects, the credits available and the priorities laid down by member States. A precise and detailed technical feasibility study is now essential.

- Co-operation agreements: During the second phase, PADIS acquired the experience to implement co-operation agreements with Guinea, the Niger and Botswana for the PADIS-DEV component. This experience has been useful in preparing co-operation agreements at continental level to give the PADIS-DEV component a Pan-African dimension. Furthermore, the experience will help in pointing the way to solutions applicable to the other components of the system.

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THE ECA STATISTICAL DATA BANK

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1. INTRODUCTION

The ECA Statistical data bank also named PADIS-STAT is one of the components of the Pan African Documentation and Information System (PADIS) project created with the financial support, among others, of the United Nations, the United Nations Development Programme (UNDP), the African Development Bank (ADB), and the Canadian Government through the International Development Research Centre (IDRC). The main objectives of PADIS is to provide access to information required by policy makers, technicians, planners and others engaged in the economic and social development of African States.

The PADIS system will have the following components:

A. PADIS-DEV, the economic and social development information component. A bibliographic reference data base system dealing with all aspects of published and unpublished literature on the development of Africa.

B. PADIS-COM, the set of other complementary bibliographic data bases concerning Africa and to be prepared in collaboration with regional and subregional institutions.

C. PADIS-PROM, the project management component data base concerning development project in their negotiation or implementation phases;

D. PADIS-CORE, the common register data base concerning African specialists, research workers and on-going research activities.

E. PADIS-STAT, the Pan African socio-economic numerical data base which deals with statistical data on Africa.

F. PADIS-TEND, the Pan African technical numerical, non-statistical data bank on national resource, industrial facilities, products and commodities concerning the priority areas of interest of the member countries.

G. PADIS-NET, the telecommunications network for system' interconnection and information dissemination throughout the African continent making available to African users scientific and technical information existing in the industrialized world's data banks by a telecommunications interconnection with the existing international network.

H. PADIS-ADMIN, the integrated system for administrative information including software packages for personnel, finance, stock-keeping and general services management systems.

The ECA statistical data bank is established by the United Nations Economic Commission for Africa (UNECA) to meet the needs of African countries for an up-to-date and [illegible]ly statistical

information and to encourage the use of improved statistics for public purposes and more specifically in the development of regional frame work for statistical information. This objective will be implemented through among others (a) the provision of a Pan African information system using the most recent technologies for data transmission; (b) the establishment of links (interconnexion of systems) with international information networks, data bases and documentation units located outside Africa.

To help in making the statistical data bank operational, a mission organized and financed by the Government of France was asked to under take a feasibility study in a number of African countries and then to consider and submit a set of proposals for organizing the management of the system. An ad-hoc inter-divisional working Group composed of Statistics, Socio-Economic Research and Planning, Population and International Trade, and Finance Divisions was also set up to study the practical problems relating to the implementation of the project. Following the conclusions of this mission and those formulated by the ad-hoc inter-divisional working Group the Executive Secretary of ECA launched in December 1981 the initial regional operations of the ECA statistical data bank. The overall responsibility for the design of the specifications of the ECA statistical data bank and its management has been vested with the Statistics Division. PADIS provides the necessary computer services.

2. THE ECA STATISTICAL DATA BANK

The ECA statistical data bank contains statistical information on social, demographic, economic and environment[illegible]istics of the African states. The major classifications of the contents of the ECA Statistical data bank is contained in Annex 1.

The main objectives of the ECA statistical data bank is to provide a response to the requirements expressed by the African countries concerning the up-to-date information needs of the continent for planning and monitoring economic and social development. The ECA statistical data bank therefore aims to:

A. Compile statistical data in a computerized form;

B. Provide ECA statisticians, economists and demographers with direct and speedy access of [illegible]can statistical data and to provide them with data processing and analysis services;

C. Automate the publications of ECA's st[illegible]istical information system;

D. Disseminate comprehensive and up-to-da[illegible] statistical information to users;

E. Provide assistance service[illegible] to member States who plan to set up statistical data [illegible]

F. Give users other types of services which are required from the system.

The ECA statistical data bank consists of three levels of data bases integrated into one system of information. Level I is expected to provide a comprehensive country profile of one to four pages of statistical data on any one African country or region. It is essentially structural indicators of population social and economic infrastructures, some aggregates of national accounts, and some regional and international comparisons provided over 2 to 5 periods.

Level II contains the bulk of statistical data available at very low level of aggregation over long period of time. It will cover all the fundamental data produced monthly, quarterly and yearly enabling the calculation of dynamic indicators which will allow monitoring of current economic facts.

Level III data base contains selected time series statistical data over a 21 year period for elaborate calculations and econometric modelling. The data contained in this data base are for aggregates and selected commodities which are frequently sought by users.

The implementation of level I depends on the progress of levels II and III. The work of level II is substantial and has been delayed due to the lack of resources, namely adequate computer time and facilities as well as staff.

Figure 1 displays the design concept proposed for the Statistical data bank and consists of seven sub-systems. It is a comprehensive model comprising all the three levels of statistical data bases integrated into one system of information allowing input processing, update processing and output processing. It would be inappropriate at this time to definitely describe each and every element of all the sub-systems; nevertheless a general design is presented for future improvements and expansion.

Sub-systems 1 through 3 are input processing systems for levels II and III data bases while sub-system 5 is input and update processing system for building and maintaining level I data base.

Sub-system 5 is used for direct on-line application. It is also used to update level III data base interactively.

Sub-systems 4 to 6 are used for update processing. Sub-system 6 is an off-line storage and retrieval system of level II data base. It is used to store the data off-line on either magnetic tapes or serial disks. It has the capability of restoring all or selected data from the off-line storage media.

Sub-system 7 is an output processing system for the three data bases. It has the following six major functions:

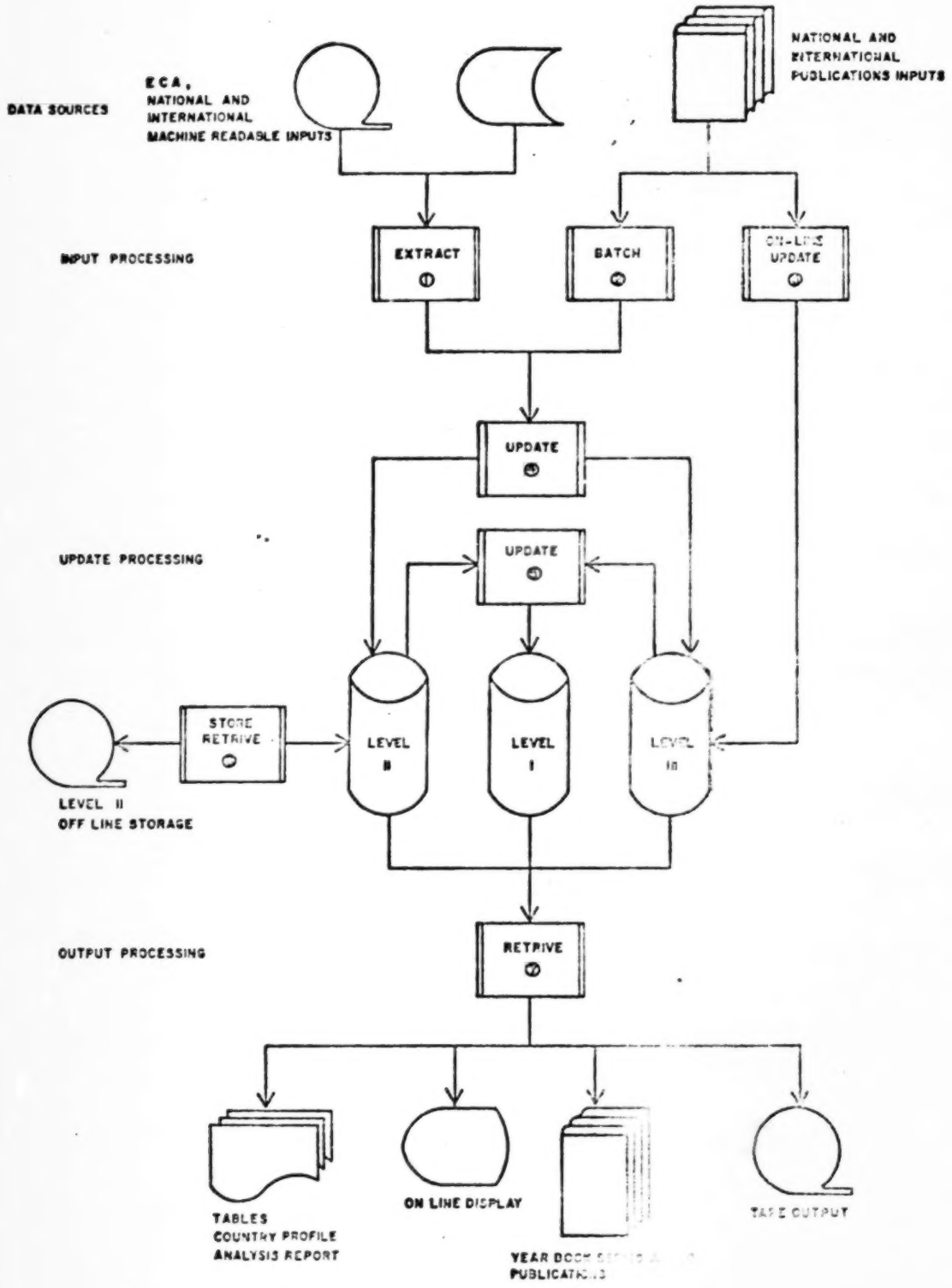

Figure 1. The ECA statistical data bank

A. Produces formatted tables for statistical use.

B. Produces formatted output tables and graphs for the various statistical publications.

C. Produces a comprehensive country profile of one to four pages for a given country or countries on video terminal or gives hard copy printout.

D. Produces an on-line statistical information on video terminals or gives hard copy printout.

E. Produces formatted machine readable data on magnetic tapes or disks.

F. Produces formatted statistical data on magnetic tapes or disks for further analysis.

3. BASIC BASICS OF THE LEVEL III DATA BASE

The level III data base has been developed on HEWLETT PACKARD HP 300 Series III mini computer using the HP Data Base Management System IMAGE 3000 (DBMS). Although business oriented, this DBMS was used because of (a) cost of development of a DBMS in-house would have been prohibitive, and (b) exploration of availability of proprietary packages suitable for statistics and compatible with the existing system has not yet been successful.

User-written programmes have also been developed to bridge the gap between the data base requirements and the facilities available. They can, in particular, interface the system for on-line or batch processing. In addition a user-written table generator package has been developed to produce off-line all the various kinds of tables presently required for ECA Statistics Division's publications from the data base. These programmes are all written in COBOL. For application programmes the data base management system IMAGE 3000 provides a set of library procedures which can be called from BASIC, COBOL, FORTRAN, and SPL.

The data model type of the data base is relational. Every data element can be linked together with every other. That way, information can be retrieved in a variety of different forms with multiple keys. Information can also generally be sorted by any field in the record.

The access to the data base has not, however, been satisfactory owing to an abnormal response time experienced with the computer system. The security system prevents unauthorized persons from deliberately or accidentally gaining access to the data base.

Theoretical aspects and long term options were left for later attention owing to (a) lack of [illegible] sity to computerize as soon as possible ECA Statistics Division's publications using data from the data base.

4. CONTENTS AND STRUCTURE OF THE LEVEL III DATA BASE

The contents of the data base are annual time series statistical data covering the period 1965 to 1985. The data have been entered from pre-processed disk files, data collected for the National and International publications; and from the 1982 African Statistical Yearbook. Provisions have also been made to include in the data base selected monthly, quarterly and half-yearly data for international trade statistics. The data contained in the data base are for aggregates and selected items which are frequently sought by users.

The data relate to the 50 independent countries of Africa which are members of ECA. Furthermore data are also given for Namibia, Reunion , Western Sahara, South Africa, and selected regional groupings.

The capacity of the data base has been set at 150,000 series and can be expanded if disk space resources are made available to the ECA Statistics Division. Over 60,000 time series statistical data have already been entered into the data base. The end-user can also generate his own data from those stored in the data base through an exchange file, irrespective of the language of the application programme available in the set provided by the system.

The series are divided into broad categories of statistics which are namely, population and employment, national accounts, agriculture, industry, transport and communications, finance, price international trade, education and health, and can be expanded to cover such data as environment statistics.

The data base is made up of 9 different sets of data, each containing a specific set of information. The time series statistical data is contained in one detail data set SDATA. Each data record contains 21 values flagged with two characters of footnote and source descriptor, the first of which indicates the type of data (official, estimate, etc.) and the second the source of the data in broad terms.

The other five data sets contain pertinent information on the series identifier, mode of observation, reporter country, partner country and the unit of observation. The elements in these files also serve as keys to dynamically access the detail statistical data set. The data base management system stores pointer information with each detail time series data which links the data record with these five data sets forming a chain.

The remaining three data sets are used for creator identification, password checking, and transaction processing control. The structure and linkage of the data sets are shown in figure 2 below.

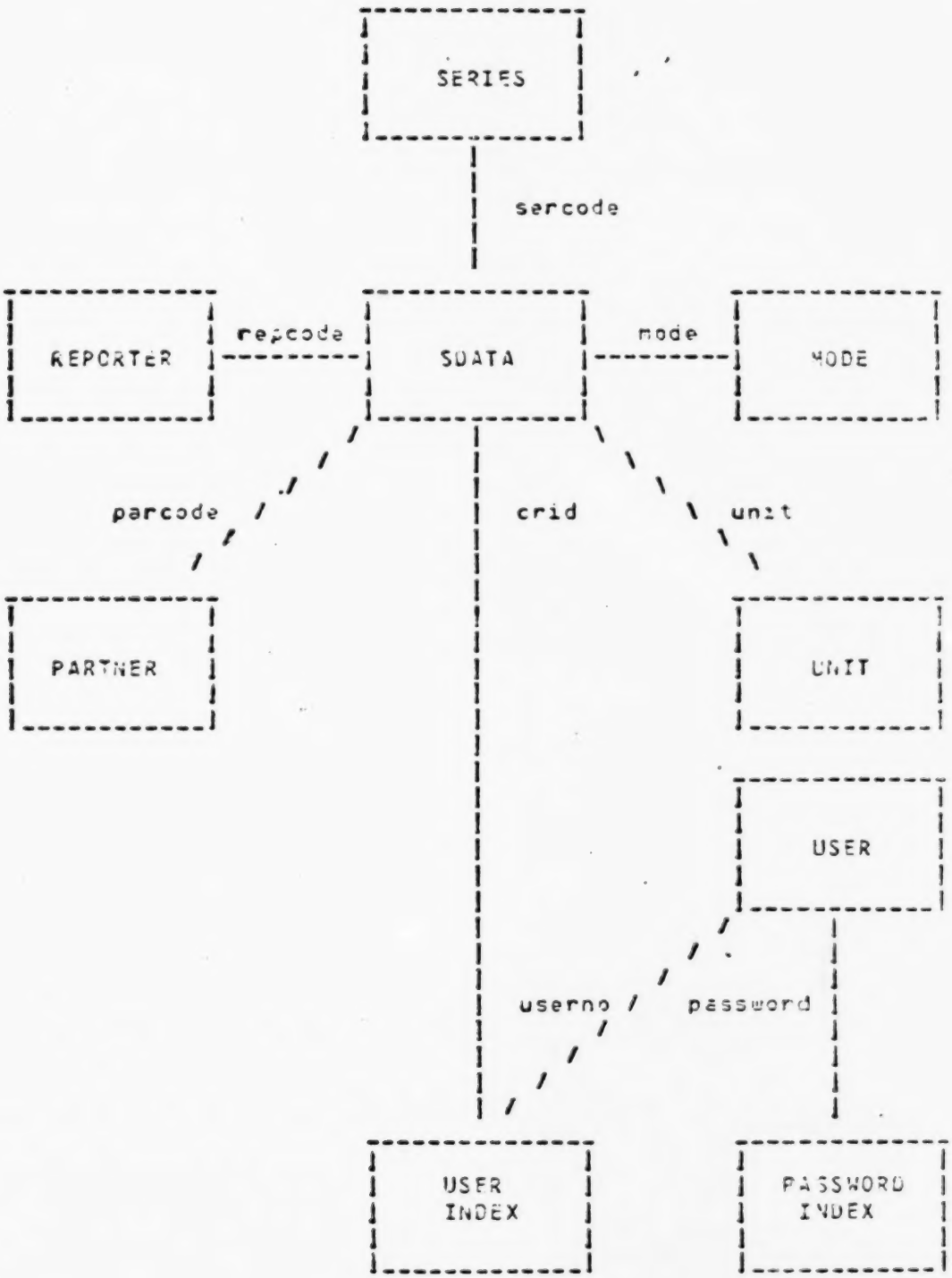

Figure 2. Level III data base structure

5. MAIN USES OF THE DATA BANK

The main functions of the ECA Statistics Division are to provide (a) technical assistance to ECA member countries in statistics, and (b) a regional statistical information service. To perform particularly the second function, the data bank aims primarily at rationalizing the storage of all data which are presently scattered at ECA in various forms.

It will still take some time before the statistical information in the data bank can be made available to enough users through computer readable forms. The preparation of regular and timely statistical publications will therefore be one of the main functions of the data bank for some time. The African Statistical Yearbook parts North Africa and Eastern and Southern Africa have already been so produced and sent for reproduction.

The data base is much more than a single statistical computerized publication. It facilitates calculations, use of econometrics and implementation of models through the use of a more powerful statistical packages such as the Statistical Package for the Social Sciences (SPSS) which can be interfaced with the system. Greater possibility of analysis of the information is, therefore, provided for the solution of and complex problems of social and economic issues of the region.

Bringing the data base to a fully operational stage will enable the ECA Secretariat to perfect and stabilize the methodology that it intends to recommend to its member states. This will also give an opportunity to develop in a joint framework at low cost softwares for calculations, modelling, tabulation, data base management system, and data query packages that the countries could not undertake solely either on account of lack of funds, or because such work is not given a priority. All this joint effort will have a feedback effect on the development of the data banks concerned in the region.

Transborder data flows will be considerably facilitated among member States through the use of the data bank. ECA member countries will thus be able to considerably speed up the dissemination of their social and economic information which was traditionally released slowly, sometimes incompletely, and often with tremendous difficulties through various publications. Each member country will be able to evaluate its own economic and social performance in the light of that of other countries without delay.

The use of the data bank at the regional level will induce training side effects in electronic data processing techniques as well as in statistical documentation that will have to be implemented for each statistical data bank developed. These effects will, no doubt, be of great benefit to statistical development in the region.

The data bank will also facilitate exchange of statistical information between the continent and the international organizations reducing considerably the delay caused by publications production and dispatching. It will, in the long run, make accessible for its African users the data bases available in other parts of the world as supplementary development information sources.

ECA member States will also take advantage of the experience gained by other countries of the world in data base technology. This technology will be for instance first transferred to ECA which will master and if necessary adapt it before releasing it to member states.

Finally, up-to-date statistical materials for socio-economic studies on Africa will be easily available enabling the enrichment of research work at the international level. Complex African socio-economic problems will therefore be more lightened and will be able to receive adequate solutions.

6. IMPACT ON STATISTICAL DATA BANK AND ECA MEMBER STATES

The implementation of the data bank is expected to lead to (a) establishment of statistical data bank in all countries of the region, (b) ready availability of statistical data through telecommunication systems and dissemination on magnetic tapes, hard copies, microfishes, or computer-produced publications at the regional level and in all countries of the region.

To achieve the above goal, the network component PADIS-NET was included in the implementation programme of PADIS. This network component for systems' interconnection and information dissemination throughout the continent has been conceived as a mechanism for the establishment of institutional and technical links between PADIS and the ECA member countries, as well as among the African countries themselves.

The network component of PADIS includes (a) one central co-ordination office sited at ECA Headquarters, (b) four subregional co-ordination centres per ECA sub-regions (North Africa, Central Africa, East and Southern Africa, and West Africa), (c) PADIS institutional participating centres developed in co-operation with regional or subregional specialized organizations in order to co-ordinate their participation in the PADIS programme, and (d) National Information and Documentation Centres (NIDC).

7. FUTURE WORK

The rapid and proper implementation of the data bank requires that adequate resources be made available to the ECA Statistics Division. Despite present insufficient resources, a considerable amount of work has already been accomplished. Certain inputs, however, continue to be lacking for the satisfactory development of the data bank and its release to the member countries. They

are being tackled progressively as the necessary resources become available.

The access to the data base needs to be substantially improved with a view to freeing as much as possible end-users from computer technology knowledge and programming. To this end high-level command language will be developed to facilitate the use of the data base via menus which will prompt at critical places during procedures or allow users to manipulate data with commands that resemble simple English or French.

Presently only simple calculations based on basic arithmetic computations can be used for deriving new statistics. Though the data base does not provide facilities for statistical analysis and graphics, it is possible to generate extract files to be put into statistical analysis and graphic packages. There is therefore a need to further develop the system to offer substantial possibility of calculation, graphs, analysis and modelling which will permit the user to directly input data stored in the data base into his application programme.

The codes of series for commodities have been developed using international classifications. Standard International Trade Classification (SITC), Revision 2, and International Standard Industrial Classification (ISIC) have been used for International Trade and industrial commodities respectively. For the other series the codes have been based on the rough classifications of the UN Directory of International Statistics. The latter does not suit the purpose of coding series for the data base. A particular attention should be given to this matter at the international level in order to standardize codes of statistical series used in international data bases. This would facilitate exchange of information among data banks.

8. CONCLUSION

One of the main objectives which was to give rapid data bank service to users has somewhat been achieved at least for users within the ECA Secretariat. The data base is partly operational in that only data for North, Eastern and Southern African countries have been loaded. Those for the other African sub-regions are underway. A certain amount of work, however, is required before releasing the data bank to outside users.

The project of establishing a regional statistical data bank in Africa is both ambitious and modest. It is ambitious because it aims at providing rapidly accurate statistical information on the social and economic conditions of ECA member States with all tremendous difficulties in the field of statistics. It is modest because only few resources are devoted to it, though it is a very important tool for the socio-economic development of the countries of the region. A non-negligible teething period will therefore be necessary before the data bank becomes fully operational to all potential users.

ANNEX 1

MAJOR CLASSIFICATION OF THE CONTENTS OF THE ECA SUBJECT DATA BANK

1. SOCIAL, DEMOGRAPHIC AND RELATED STATISTICS

1.1 Demographic Statistics
1.2 Housing Statistics
1.3 Labour Statistics
1.4 Education, Science and Technology, Culture and Mass Communication Statistics.
1.5 Health Statistics.
1.6 Distribution of Income, Consumption, and Social Security Statistics
1.7 Other Social, Demographic and Related Statistics.

2. ECONOMIC STATISTICS

2.1 National Accounts and Balances.
2.2 Agriculture, Forestry and Fishery Statistics.
2.3 Industrial and Construction Statistics.
2.4 Trade Statistics.
2.5 Transport, Storage, Communication and Tourism Statistics.
2.6 Finance Statistics.
2.7 Price Statistics.
2.8 Industrial Property Statistics.
2.9 Other Economic Statistic.

3. OTHER STATISTICS

3.1 Environment Statistics.
3.2 Statistics on International Organizations.
3.3 Other Statistics not elsewhere classified.

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ASSISTANCE TO MEMBER STATES AND AFRICAN INSTITUTIONS

INTRODUCTION

This paper attempts to provide a basis for discussions on the technical assistance delivery aspects of the Pan African Documentation and Information System (PADIS) Programme for the purpose of improving the information handling capabilities of African countries thereby contributing to the attainment of their stated development goals and objectives.

The paper is structured in the following manner:

Section I contains a description of the present state of information and documentation at the national, subregional and regional levels.

Section II recapitulates the main roles and functions commonly attributed to co-ordinating organs of national information and documentation activities.

Section III discusses the principles underlying PADIS subregional information and documentation centres and the roles they are expected to play.

Section IV provides an overview of the general institutional, manpower, material and financing requirements of national information and documentation co-ordinating organs.

Section V discusses the elements of PADIS assistance to Member States in the immediate future.

Section VI is an account of the progress made to date by PADIS in its efforts to assist in the creation of national centres.

I. STATUS OF INFORMATION AND DOCUMENTATION IN AFRICA

1. Unavailability of information, inadequacy of data, lack of information on sources of information, lack of bibliographic control, inadequate exchange of experiences between countries at the same level of development, etc. are complaints frequently voiced by African government officials, academicians, researchers in the applied sciences, business men and the like. These complaints relate to some degree or another, to the unsatisfactory organization of information and documentation. Despite the persistence of the problem, seldom have systematic studies been conducted to identify the nature and extent of the need and to match it with the generally weak information infrastructure with a view to determine remedial action. Therefore, with few exceptions, the status of information and documentation activities at the national level remains shrouded. Needless to say, this has inhibited inter-country comparisons and, for this reason, the discussions in this section suffer from a basic lack of detail.

A. The National level

2. The situation at the national level is extremely diverse and it is difficult to fathom it within reasonable accuracy. Generally, Member States in the North African subregion have relatively better organized information infrastructure although the situation within these countries themselves differs significantly. In the Central, East, South and West African subregions some countries have better capacities in one or more areas (institutional, manpower, etc.) while the combination of factors, generally, results in a service below the desired level. The problem can be subcategorized, for ease of analysis, into (a) institutional constraints such as policies, legislation, co-ordination, etc; (b) human resources constraints such as manpower, education, medium-level training and the status of information personnel; (c) infrastructural bottlenecks including methods and technologies; (d) the inability of existing services in meeting user needs; and (e) socio-cultural aspects such as illiteracy, a low level of book production; reading habits; etc.

3. In so far as institutional provisions are concerned, the following generalizations can be made: very few countries have a central authority responsible for information and documentation policies; even when such agencies exist there is vagueness as regards their functions and roles; legislations are inexistent or ineffective; co-ordination between government agencies responsible for information activities such as national libraries, national archives, library schools, etc. are poor; information and documentation activities are rarely included in national development plans; and, in cases where they have been incorporated, they suffer from a low rate of implementation.

4. In so far as human resources constraints are concerned, the situation can be generalized as follows: (a) very few countries have schools of information and library science (as of 1979, only 9 out of 50 countries); (b) most libraries and information services are run by personnel who had no formal training in this field; (c) the few who had formal education underwent training at schools which had a rather traditional approach to information science and librarianship; (d) there is a severe shortage of middle-level technicians in documentation, reprography, etc.; (e) follow-up and in-service training are insufficient; and (f) the information, documentation and librarianship profession has not been given the status and recognition it deserves.

5. In so far as infrastructure is concerned the situation looks as follows: (a) the scarcity of space, material and financial resources has precluded the growth of services; (b) methods and mechanisms for the acquisition, processing and dissemination of information, particularly as regards standards and technologies are poorly developed; and (c) inter-agency co-operation is non-existent or has been frustrated by ineffectiveness.

6. The services provided by existing sources of information are far from effective due to the insufficiency of their marketing effort. The unavailability of union catalogues, national bibliographic control and directories to source of information preclude the potential use of existing information. Also, the acquisition pattern of information centres is often incoherent with the needs of its immediate users due to the lack of sufficient integration between the activities of the parent agency and its information support unit. At the macro-level national information plans are not coherent with national development plans.

7. The socio-cultural milieu in which the African information and documentation activity operate is characterized by certain 'limiting' variables which could directly or indirectly contribute to the low status it is accorded. These include: the low literacy rate; the low level of book and reading material production; poorly developed reading habits of the general public as well as the elite; and, the relatively lower educational level.

B. The Subregional and Regional levels

8. The information and documentation handling capacities at the subregionaland regional level exist within the framework of internatinal, inter-governmental or non-governmental organizations whose fields of competence embrace a particular subregion or region. Such organizations often have a specialized sectoral or mission-oriented area of activity, although some have broad multi dimensional responsibilities (e.g. UNECA, Economic Community of West African States, etc.). As a result, most

documentation systems housed within such organizations have an information scope that is restricted to the field of competence of the parent agency.

9. One of the apparent weaknesses at the subregional and regional levels is the lack of co-ordination and exchange of information between institutions that deal with the same or related subject areas. However, the situation seems to be improving with the emergence of co-ordinating mechanisms (e.g. POPIN-AFRICA in population studies, the Food and Nutrition Information Network, etc.).

10. The methods and mechanisms used for information and documentation work used by regional and subregional organization are relatively better suited than the ones in use at the national level. However, there is much room for improvement in coverage, marketing of outputs, diversifying services, and the use of appropriate technologies.

11. Some regional and subregional organizations undertake a variety of information and documentation activities including publishing of indexes and directories, the dissemination of information to an established clientele and even relatively advanced services like SDI and question-and-answer services.

II. ROLES AND FUNCTIONS OF NATIONAL INFORMATION AND DOCUMENTATION CENTRES

12. National information and documentation centres (NIDC) are, by definition, those organs that plan and co-ordinate the activities of libraries, documentation centres, archives and the like at the central level. In developing countries these function is universally played by the State as part of its functions in promoting social and economic development.

13. The justifications for the establishment of a central organ responsible for information and documentation affairs is beyond dispute and shall not be repeated here. However, three important recommendations made by UNISIST - the Intergovernmental Conference on a Scientific and Technological Information for Development - are cited below:

> Recommendation 15. A governmental or government-chartered agency should exist at the national level to guide, stimulate and conduct the development of information resources and services;
>
> Recommendation 16. The national agencies should give increased attention to the requirements of modern information transfer networks using advanced processing and communication facilities;

> Recommendation 21. The action of UNISIST with regard to the scientific and technical information needs of developing countries should be (i) to provide a forum where assistance to library and information services in developing areas may be discussed; (ii) to propose guidelines for the establishment and management of effective information networks in developing countries; (iii) to take part in the design of a few pilot projects....

14. The principles underlying the PADIS technical assistance scheme are in conformity with these UNISIST recommendations, except that it takes more active participation in the establishment of national centres than was stipulated under UNISIST.

15. The roles and functions of NIDCs are dependent upon several factors including the stage of social, economic and technological development attained by the society in question; the stage of development of the information and documentation services; and, the national development priorities as stated by national plans and strategies. An analysis of the national information and documentation capacity in relation to national requirements emerging from stated priorities should make possible the drafting of an information plan.

16. Such an information plan should take into account the various elements of the national system (public libraries, specialized libraries and documentation centres, etc.) and the degree and type of relationship that shall be maintained between these elements and the central organ to be responsible for all information and documentation affairs. Whether these central organ should be the NIDC itself or a body comprised of representatives of the various elements of the national system (Board, State Committee, etc.) is determined by the relative strength and weaknesses of the latter in meeting information needs of the economy. Where the existing infrastructure is relatively weak, there is reason enough to advocate centralization in the first instance since decentralization presupposes a unified methodology and a clear division of responsibilities that is concomitant to the capabilities of each participating element.

17. In either case, the NIDC shall have the priority task of developing policies and legislation. It shall be the duty of the NIDC to synthesize the national development plan to produce an information plan that will be executed in collaboration with documentation centres and specialized libraries that operate at the various levels of the political and economic structure. In reverse, the NIDC should also facilitate the incorporation of the information plan into the national development plan.

18. Co-ordinating the national information activity by maintaining compatibility, regulating the exchange of information, facilitating resources sharing, delineating division of responsibilities and relinquishing some central roles to

appropriate units in a progressive and timely manner will be an important function of the NIDC. Given the generally limited human, financial and material resources available for documentation activities, the installation of some central facilities that can be effectively accessed by all parties of the national system will be an important contribution to resources sharing and the optimization of resources use. Some amenities that respond favorably to such arrangements are high level manpower, data processing facilities, reprographic equipment, marketing of information services and document delivery mechanisms.

19. However, the benefits of centralization can be fully realized only if the central organ (the NIDC) is ready to relinquish some of its functions to the subsidiary elements as and when they develop the appropriate capabilities. In fact, all the scarce resources that can be shared by several elements need not be located at the NIDC.

20. The NIDC shall undertake active information and documentation work and it should play a pioneering role for the introduction of new methods, mechanisms and technologies. In reality, the information and documentation field is lagging behind other sectors of the economy and it, therefore, needs an injection of new skills and technologies. The NIDC should serve as a test ground with the realization that successful applications will be replicated at other levels.

21. The educating functions of the NIDC is inherently limited to the provision of in-service training to medium level practitioners with a view to upgrade their skills and expertise. However, it could play a valuable role in the development of curricula for the information and documentation field. It could also play an important role as a site for practical training for those undergoing formal education at the medium or higher levels. The co-ordination of NIDC activities and high level formal education have been found fruitful as is the case in Morocco where the Centre National de Documentation and the Ecole des sciences de de l'information have developed in parallel, each benefitting from the existence of the other. The NIDC shall also undertake the the traning of users in order to advance the use of the system's outputs.

22. The NIDC should endeavour to improve the status of information and documentation personnel including their remuneration at a level consonant with their education and function. Admittedly the usefulness of information scientists and librarians to the society at large is a precondition to the improvement of their social status. The effectiveness and usefulness of the national information system and the rise in prestige that will be associated with the new policies and technologies shall assist in bringing about positive results.

23. One role of the NIDC that cannot be delegated to others for a reasonably long period of time is international and

regional co-operation. However, with the growth and development of specialized documentation centres and libraries into higher stages, it should be possible for them to communicate and exchange information with institutions and documentation centres active in their respective fields of competence at the sub-regional, regional or international levels.

24. Lastly, the NIDC shall, directly or indirectly, contribute to the elimination of the socio-cultural barriers that inhibit the production, distribution and consumption of reading materials.

25. The information and/or subject scope of the NIDC should, in principle, be as broad as possible. The desirability of such a broad scope is partly due to the role the NIDC plays in co-ordinating the activities of several sectoral, discipline or mission oriented systems which will in any way induce multi-dimensionality. In parallel, its broadness in scope shall not be devoid of national realities. Rather, the information to be handled both by the NIDC and its elements should be in strict conformity with national priorities. For instance, a predominantly mining economy should be supported by a strong mining information and documentation service and, therefore, the need for the NIDC to support activities leading to it. Aside of subject and discipline concerns, the definition of the scope of the NIDC shall take into account information needs oriented to the management of and knowledge about resources. The NIDC should facilitate the emergence of methods and mechanisms for taking inventory of available skills, capacities and, whenever possible, natural resources.

26. Numerical information and, particularly statistical data are normally handled by national statistical offices. It is common that most statistical data are reproduced in the form of statistical abstracts of one type or another. The NIDC shall maintain a collection of such publications. But it is not advisable that it holds a stock of 'unaggregated' statistical data, at least not at its embryonic stage.

III. ROLES AND FUNCTIONS OF PADIS SUBREGIONAL INFORMATION AND DOCUMENTATION CENTRES

27. The experience of the industrialized countries and, to a limited extent, that of the developing regions indicates supra-national information and documentation activities are usually devoted to a specialized sphere of learning. In general, their activities run parallel to research and development work and the parent agencies are usually centres of excellence in a particular field. With the advent of modern information processing and dissemination technologies, it has been possible to create links between specialized documentation centres existing at the national and supra-national levels in an unprecedented manner. The result has been the emergence of networks and

large depsitories of data bases which, today, dominate the information services market. The fact that most information and documentation systems in North America and Europe had developed independently induced the need to apply expensive and complex interfaces and protocols to enable access to depositories of information distributed over a large geographical area.

28. In the developing regions, where developments in the information and documentation field are still at an embryonic stage, supra-national systems and networks have as yet to emerge. However, there is a positive tendency in this direction mainly, due to the desirability of inter-country exchange of information. It can be safely assumed that networking will be an important feature of developments in the information field in these regions and, hence, the need to take into account networking parameters in the design of new and the modernization of existing national information and documentation centres has become pronounced.

29. In Africa, where the Pan African Documentation and Information System is playing an active role, due recognition is being given to networking aspects. In this endeavour, a three-tier network has been necessitated: the national, subregional and regional levels. The justifications for establishing co-ordinating mechanisms (centres) at the national and regional levels is fairly straight forward. The creation of the intermediate (subregional) level is dictated by two important factors and perhaps may need some explanation.

30. A combination of factors including, the size of the continent, the large number of countries (nodes), and the state of communication services make it managerially impossible at this stage to contemplate a highly developed network (e.g. one NIDC accessing any other NIDC). Similarly, networking based upon access through one intermediary (the PADIS Central Co-ordination Office, for instance) does not overcome the barriers and delays imposed by poor communication services. On the contrary, networking with subregional centres and one regional centre as intermediate features and coupled with a suitable distribution of reference data bases and primary document depositories seems a better option. Also, such an arrangement as and when traffic rates justify it, is favorable to enhanced applications such as postal courier services, partial use of telecommunication links between selected centres, etc. Nevertheless, it is difficult to analyze to its true extent the trade-off between cost and effectiveness as measured by a time factor for given levles of managerial and technical resources.

31. The second factor that dictates the existence of a subregional element does not have to do, so much so, with the network aspect. Rather, it is called for by the need to intensify technical assistance delivery to emerging NIDC. It is common knowledge that intensity of development action appreciates

significantly through decentralization than under a centralized framework. It is believed subregional centres will serve as effective springboards for technical assistance to NIDCs and specialized documentation centres within their respective subregions. They will serve as sites for training programmes and will permit a higher degree of resources sharing particularly, data processing equipment, reprographic facilities and specialized manpower.

32. In addition to the subregional centres described above, there exist quite a few inter-governmental and non-governmental organizations in Africa who operate at the regional and subregional levels and who have established or are in the process of establishing information and documentation systems and networks that are of relevance to the work they conduct. As generators and users of information and as centres of excellence in their particular competences, they have been identified by PADIS as important elements of its system and network. Hence, the concern for institutional participating centres (IPCs). At present, no elaborate plan exists as to their involvement aside from the fact that they will benefit from the advisory and training services to be sponsored by PADIS. But one cannot rule out the contributions they can offer as subject specialists in the development of methodologies and in the co-ordination of information services in particular disciplines and subject areas.

33. At the regional level, the PADIS Central Co-ordination Office provides the impetus for the proliferation of mechanisms that identify, gather, process and disseminate information, itself being active in the process. Its functions and roles have been discussed in detail elsewhere and shall not be repeated here.

IV. HUMAN, INSTITUTIONAL, MATERIAL AND FINANCIAL REQUIREMENTS OF NIDCs

34. The requirements of NIDC's are dependent on a variety of factors, including, the stage of development of the country in question and the priority accorded to information and documentation activities which, in turn, determine the degree and variety of services demanded and the resources that can be allocated for the purpose.There is unanimity that every nation deserves to possess an information and documentation mechanism that conforms to its development goals and objectives. model that fits into the web of factors and their interaction can be defined only after an in-depth study.

35. Nevertheless, some ideas could be forwarded as regards institutional, human, financial and material needs of emerging NIDC's.

36. The measures needed by way of institutional provisions such as legislations and policies requires the awareness of Governments and their determination to take action. Often the problem is inability to enforce and implement legislations and policies while the setting up of an organization has equally been difficult. Unless these provisions are available and unless the latter is furnished with reasonable resources it will be rather impossible to improve the state of national information and documentation activities.

37. The available human resources mix particularly duing the take-off (design, policy setting, etc. of an NIDC) period is crucial since there will be a need to critically analyze the old method and approach with a view to change it wherever appropriate. The selection of new staff for the NIDC should be conducted with caution in order to maintain a balance between information scientists, librarians, subject specialists, reprography specialists, and persons with computer know-how. In view of the tremendous need for training at the subnational level has yet to be met, it is always advisable to have a variety of resource persons on various aspects of documentation and information science in order to draw upon their specialist knowledge and experience. This latter fact should also be taken into account while preparing staff development plans for the NIDCs own staff.

38. The material needs of NIDCs will vary from one country to another and over time within one NIDC itself. It is recommended to phase-in technologies within a properly spaced out plan. The introduction of computer technologies is not an immediate necessity. But the decreasing cost, growing versatility, the variety of options and improving maintenance conditions is making them technically and economically feasible even at an early stage. Even more important is, however, the availability of hard and micro reprographic equipment. Space, office equipment (particularly shelves), supplies and utilities such as telephones and telexes have been common obstacles to the growth of library and documentation services and shall be remedied.

39. The most pressing problem faced by NIDCs, and a factor that depicts the low priority they receive vis a vis other national priorities, is the unavailability of financial resources on a continuous basis at sufficient levels. Usually, Member States are better disposed towards making budgetary local currency allocations once there is adequate realization of the usefulness of NIDCs. However, their foreign currency needs are weigled in comparison to an altogether different set of priorities in which NIDC requests have very little chance of succeeding. This is even more true when the requests are for the purchase of computer and reprographic equipment which are considered by the majority of Member States as conspicous investments. The purchase of foreign publications suffer from the same attitude. Traditionally, foreign multilateral or

bilateral aid has been a useful source of funding in meeting similar needs of statistical offices, teaching institutes, etc.

V. ELEMENTS OF THE PADIS ASSISTANCE SCHEME IN THE IMMEDIATE FUTURE

40. The fact that PADIS assistance to Member States need to be comprehensive and intensive is dictated by the poor state of information documentation activities as explained in the previous sections this paper. Evidently, the whole spectrum of assistance needs cannot be met by PADIS alone, partly because of the limited material and financial resources put at the disposal of PADIS and partly because it does not as yet possess all the requisite technical competence. Whenever, its capabilities fall short of meeting the needs of Member States, PADIS will strive to engage the collaboration of other agencies who may be better equipped to provide a solution.

41. Advisory services for the drafting of national policies and legislation and for undertaking research and studies to identify peculiar problems of the national situation will be a priority area of assistance to Member States in the immediate future. Member States, upon request, will be assisted in the planning and organization of NIDCs; in the design and implementation of information collection, processing, marketing and dissemination mechanisms as well as for the setting up of national networks. Member States will also benefit from technical advice on the selection of suitable computer hardware and software, reprographic equipment, etc.

42. PADIS assistance will also focus on the development of medium-level staff in documentation, computerized data base management and reprographic techniques through the provision of short-term intensive training. The development of senior level staff responsible for the management of documentation systems and computer centres will also be organized. Fellowships and research grants will be made available to Africans in such fields as information science, systems development, software maintenance and development, etc.

43. Financial assistance to Member States for the purchase of computer and reprographic equipment, supplies and maintenance costs will be made available as and when resources permit and when the stage of development of the particular NIDC justifies it. Wherever possible, NIDCs should strive to make use of the EDP facilities that may be available at national agencies such as statistical offices, planning ministries, etc. either on free-of-charge or cost sharing basis. More importantly, the establishment of PADIS subregional centres will provide EDP services to NIDCs free-of-charge in the production of certain outputs such as bibliographies, SDI runs, etc. which will not require on-line access.

44. PADIS will provide expertise to NIDCs during the initial take-off period depending on the type of qualifications that are missing at the particular NIDC. The aim of such assistance will be to transfer skills to nationals in the minimum possible period.

VI. PROGRESS MADE IN ASSISTING MEMBER STATES

45. As mentioned elsewhere, the first task PADIS has undertaken in this area was to sensitize Member States on the possible benefits of establishing NIDCs as instruments for the upgrading and rationalization of information and documentation services. This effort took the form of model project documents that described the outputs of NIDCs. Subsequently, several African countries were visited by staff members of the PADIS/CCO in an effort to induce Governments to take concrete action. Although better results could have been expected, the outcomes are not totally disappointing either.

46. The Government of Benin, following the advise of and the assistance it received from the PADIS/CCO had succeeded in establishing its Centre National Automatisee pour la Documentation et Information (CENADI). Three staff members have undergone training at the PADIS/CCO for four weeks each, in the management of documentation systems, computer centres and the operation of reprographic equipment respectively.

47. The Institute of Development Research of the Government of Botswana has been assisted to create a documentation centre that will gradually be expanded into an NIDC. Three staff members have undergone training at the PADIS/CCO and a workshop has been organized for documentation officers of various government agencies in Gaborone, Botswana to enable them to participate in the future national centre.

48. Similar workshops were organized in Guinea and Niger for a duration of four weeks to provide staff of various government agencies with documentation skills. In both instances a centre that will gradually be expanded into a national centre has been designated by the respective Governments.

49. Efforts were underway to establish PADIS subregional centres at the Eastern and Southern and West African MULPOCs at Lusaka and Niamey respectively. Current financial resource constraints faced by the PADIS/CCO has precluded their establishment as planned. Therefore, agreements are being concluded which will enable the respective host Governments to operate the two centres as national centres with the requisite technical assistance being provided by PADIS.

50. The above imply that concrete action at the national level is being carried out in five Member States. However, it cannot be denied that a lot more has to be done before these young centres become useful instruments for national development and future action is directed towards their strengthening.